THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXVII. No. 1970.] LONDON, FEBRUARY 12, 1901. [53RD YEAR. PRICE 6d.

TROTTER, HAINES, & CORBETT, LIMITED,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

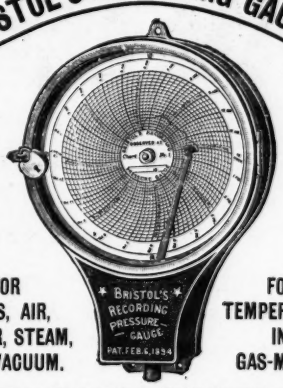
LONDON OFFICE: R. CULL, 84, OLD BROAD STREET, E.C.

HEBBURN MAIN GAS COALS.

Yield of Gas per Ton . . 10,500 Cubic Feet.
Illuminating Power . . . 16·4 Candles.
Coke . . . . . 68 per Cent.

For Prices, f.o.b. Ship or Delivered by Rail, apply to
The Wallsend & Hebburn Coal Company, Ltd.
8 Lombard Street,
NEWCASTLE-ON-TYNE.
W. RICHARDSON, Fitter.

BRISTOL'S RECORDING GAUGES



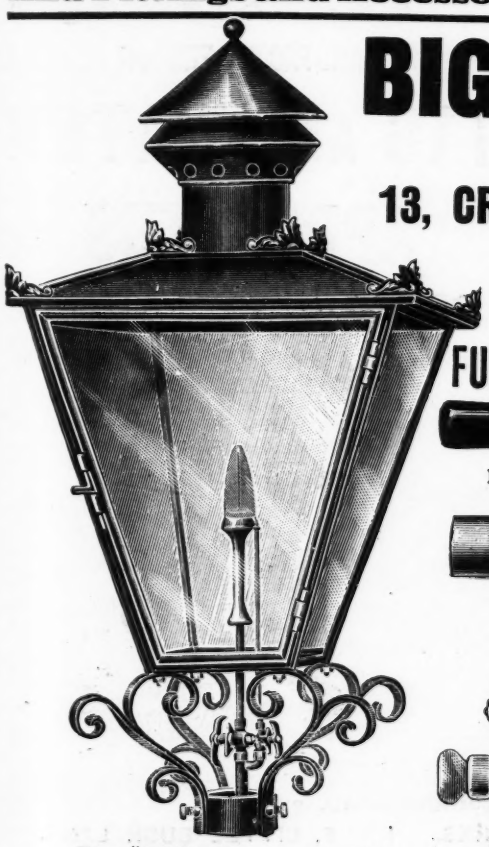
FOR GAS, AIR, WATER, STEAM, OR VACUUM.
FOR TEMPERATURE IN GAS-MAINS.
Many Thousands in Daily Operation.
J. W. & C. J. PHILLIPS,
23, COLLEGE HILL,
LONDON, E.C.

— ESTABLISHED 1830. —
PARKER & LESTER,
Manufacturers & Contractors.
THE ONLY MAKERS OF
PATENT ANTIMONY PAINT.
Parker's Imperial Black Varnish,
Oxide Paints, Oils, and General Stores, for Gas and Water Works.
WORKS:
ORMSIDE STREET, OLD KENT ROAD,
LONDON.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.
Prices and Analysis of all the Scotch Cannels on Application.

Wrought-Iron
TUBES
And Fittings and Accessories.

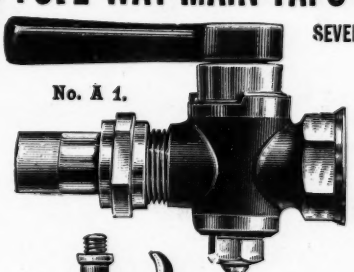
LAMBERT BROS., WALSALL,
MANUFACTURERS OF
WROUGHT-IRON TUBES & FITTINGS for GAS, WATER, & STEAM.
BRASS GAS-FITTINGS, GAS-VALVES, STEAM & WATER VALVES, TOOLS, &c., AND OF
WARNER'S PATENT MARKET GAS STAND-PIPE.
LONDON: LAMBETH BRASS & IRON CO., Ltd., Short St., LAMBETH.



BIGGS, WALL, & CO.,
GAS AND WATER ENGINEERS,
13, CROSS STREET, FINSBURY PAVEMENT,
LONDON, E.C.

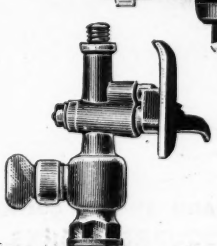
WRITE FOR OUR **PRICE LISTS** OF
FULL-WAY MAIN TAPS & LANTERN TAPS.
SEVERAL DESIGNS SHOWN BELOW.

No. A.

No. A 1.


THESE TAPS ARE
FULL-WAY
AS SHOWN.
SUPERIOR QUALITY AND FINISH IN GUN METAL.

LANTERN TAPS.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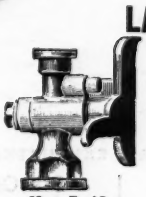
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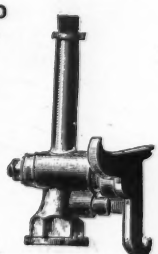
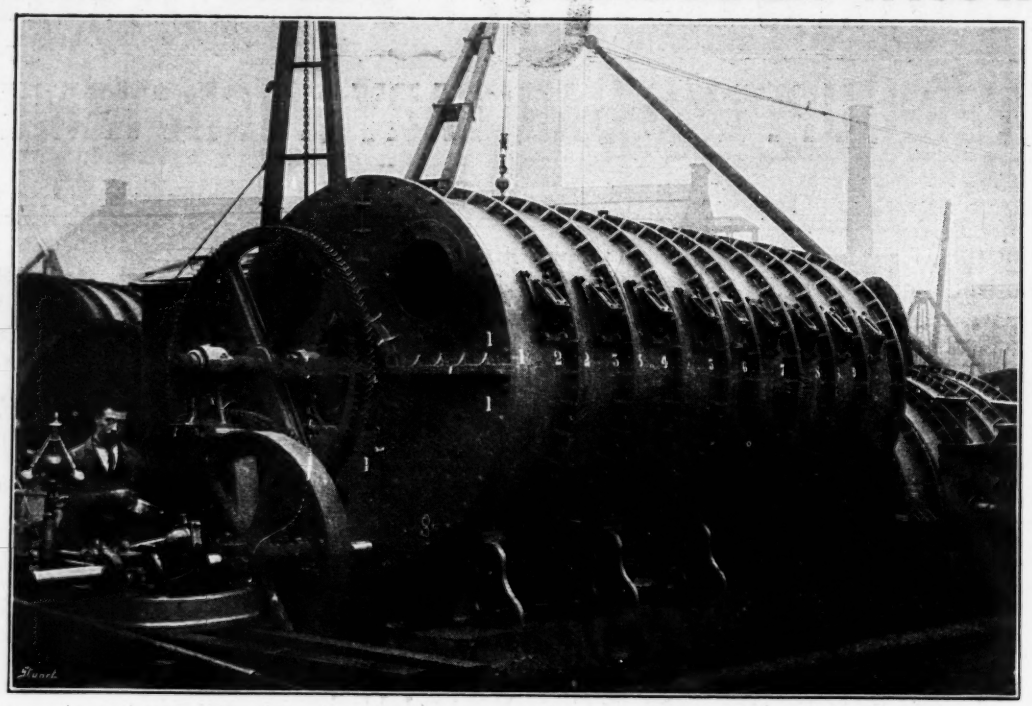

No. A 1.

The "DEMAND REGISTERED
Specially constructed for New Incandescent Burner.

PATENT "NEW" SCRUBBER-WASHER

All Sizes from 50,000 to 5,000,000 Cubic Feet of Gas per Day.



The "NEW" Scrubber-Washer can be arranged to suit all cases of the Washing of Gases with Liquids.

NOTE:—Orders received in **1900** for **MACHINES** to deal with **39,700,000** Cubic Feet of Gas per Diem.

PATENTEES AND SOLE MAKERS: **W. C. HOLMES & CO.**, WORKS: **HUDDERSFIELD.**

Telegrams: "HOLMES, HUDDERSFIELD." Contractors to Her Majesty's Government. Cablegram: "IGNITOR, LONDON."

R. LAIDLAW & SON

ENGINEERS & IRONFOUNDERS.

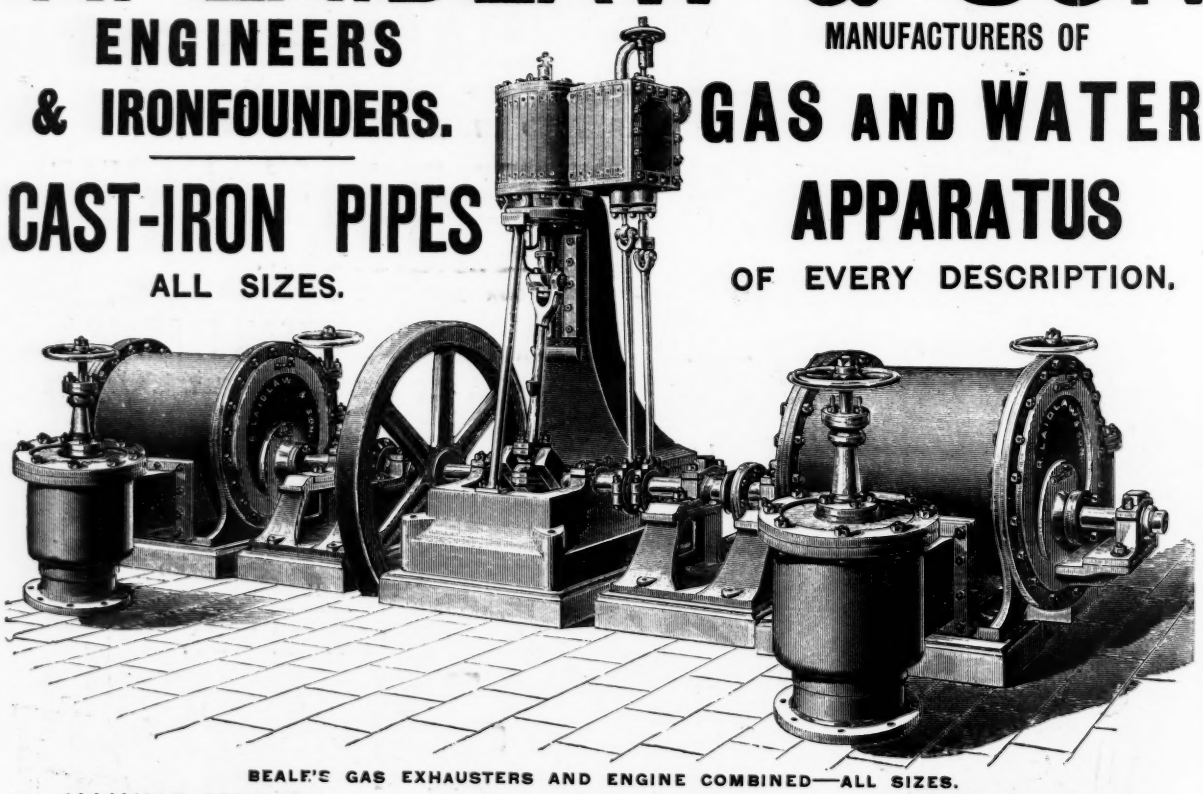
MANUFACTURERS OF

GAS AND WATER APPARATUS

OF EVERY DESCRIPTION.

CAST-IRON PIPES

ALL SIZES.



BEALE'S GAS EXHAUSTERS AND ENGINE COMBINED—ALL SIZES.

ALLIANCE FOUNDRY, GLASGOW. | SIMON SQUARE WORKS, EDINBURGH. | 6, LITTLE BUSH LANE, LONDON, E.C.

THE BARROWFIELD IRON-WORKS, LIMITED,

Late LAIDLAW, SONS, & CAINE, Limited,

GAS ENGINEERS AND CONTRACTORS,

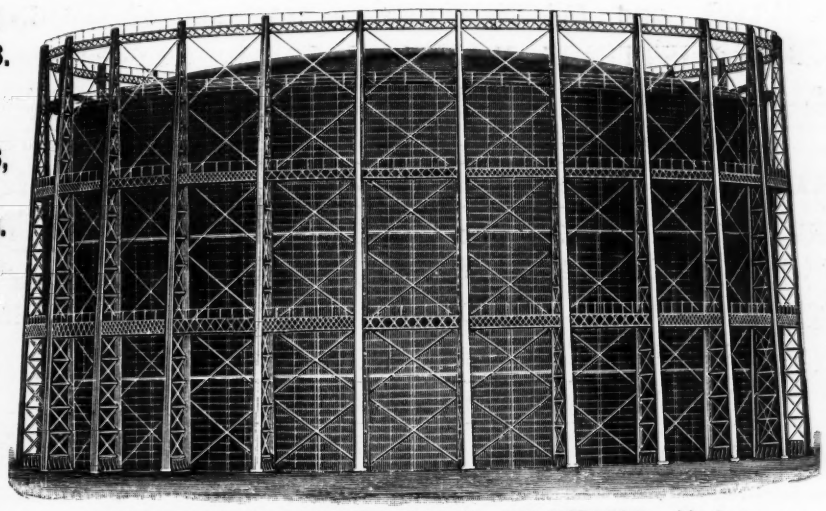
Telegrams: "GASOMETER GLASGOW." GLASGOW.

OIL PLANT AND CHEMICAL APPARATUS.

BRIDGES, GIRDERS, WHARVES, PIERS.

ROOFING OF EVERY STYLE.

PIPES, VALVES, AND CONNECTIONS.



GAS APPARATUS OF EVERY DESCRIPTION.

RETORTS, CONDENSERS, SCRUBBERS, PURIFIERS.

GASHOLDERS AND TANKS.

ENGINES, EXHAUSTERS, STEAM BOILERS AND FITTINGS.

THREE-LIFT GASHOLDER. Capacity, SIX MILLION cubic feet.
240 feet Diameter by 45 feet Deep each Lift. Erected at Glasgow, 1893.

London Office: 6, LITTLE BUSH LANE, CANNON STREET.

GEORGE ORME & CO. (Branch of Meters Ltd.)

Atlas Meter Works, PARK STREET, OLDHAM.

Telegraphic Address: "ORME, OLDHAM." Telephone No. 93, OLDHAM.

NEW CENTURY PATTERN

Patent Coin *Prepayment Gas-Meters*

Fitted with Detachable Attachments. Arranged for 1d., 1s., or any other Coin desired.

Dry Meter in Tin-Plate Case, fitted with Attachment.

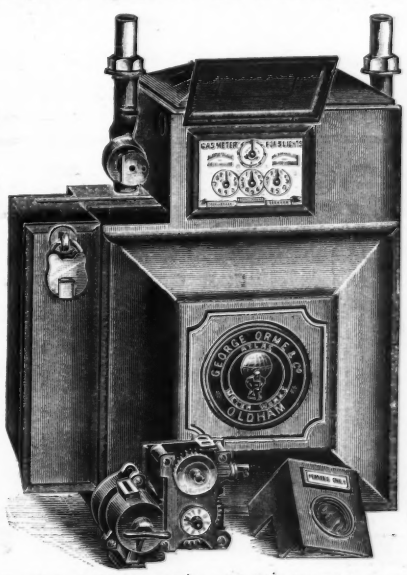
Price changed *in situ* by means of one Crown Wheel only.

COMPACT.

DURABLE.

RELIABLE.

SIMPLE.



Dry Meter in Tin-Plate Case, with Attachment removed.

Any further Particulars will be supplied upon Application.

NEWTON, CHAMBERS, & CO.,

LIMITED,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

Established 1790

LONDON OFFICE: 19, Great George Street, WESTMINSTER.

Telegraphic Addresses: "NEWTON, SHEFFIELD," "ACCOLADE, LONDON."

GAS ENGINEERS, IRONFOUNDERS, & CONTRACTORS.

Manufacturers of every description of

PLANT, APPARATUS, and MACHINERY for GAS and CHEMICAL WORKS.

RETORTS and FITTINGS, MOUTHPIECES with Self-Sealing Lids.

Improved COAL and COKE HANDLING PLANT, CONVEYORS, and ELEVATORS,

CONDENSERS, SCRUBBERS, and WASHERS.

PURIFIERS with Planed Joints a Speciality.

Patent CENTRE-VALVES, RACK and SCREW VALVES, WOOD GRIDS, and SCRUBBER-BOARDS, CAST-IRON MAINS, and SPECIALS.

STRUCTURAL WORK, COLUMNS, GIRDERS, and ROOFING.

GASHOLDERS, Cast-Iron or Steel Tanks.

DESIGNS, SPECIFICATIONS, and ESTIMATES FREE.

PIG IRON (Special Quality) for Engine Cylinders. GAS COAL famous for its UNRIVALLED EXCELLENCE.

THE WIGAN COAL & IRON CO., LIMTD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

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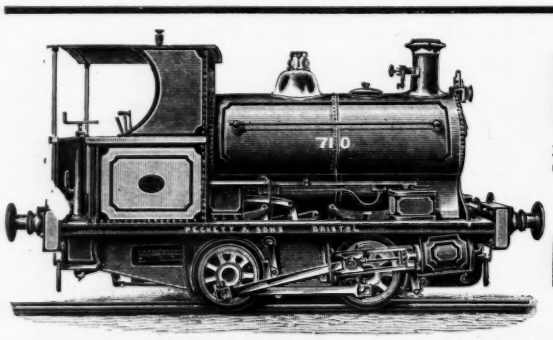
Telegraphic Address: "WIGAN, BIRMINGHAM." Telephone No. 200.

London District Office: 6, STRAND, LONDON—C. PARKER & SON, Sole Agents

Telegraphic Address: "PARKER, LONDON."



LOCOMOTIVES

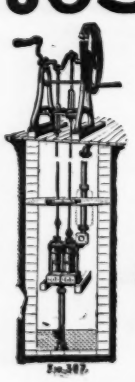
LOCOMOTIVES of all Sizes and Gauges specially constructed for Main and Branch Lines, Contractors, Docks, Gas-Works, Collieries, Iron-Works, Brick and Cement Works, &c Locomotives of various Sizes always in Stock, ready for Immediate Delivery.

Photographs, Specifications, and Prices on Application.

PECKETT & SONS, Atlas Locomotive Works, BRISTOL.

Telegraphic Address: "PECKETT BRISTOL."

JOSEPH EVANS & SONS, CULWELL WORKS, WOLVERHAMPTON.

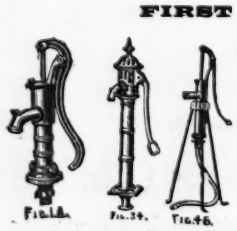


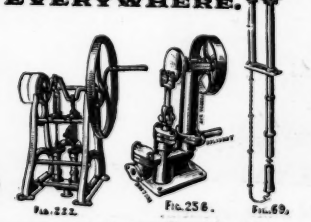
PLEASE APPLY FOR CATALOGUE No. 8.

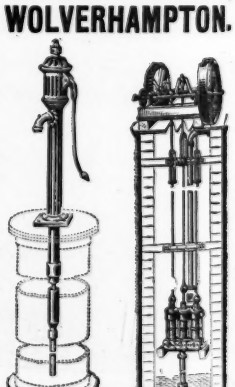
Telegrams: "EVANS, WOLVERHAMPTON." National Telephone No. 7039.

TRADE MARK.

FIRST AWARDS EVERYWHERE.

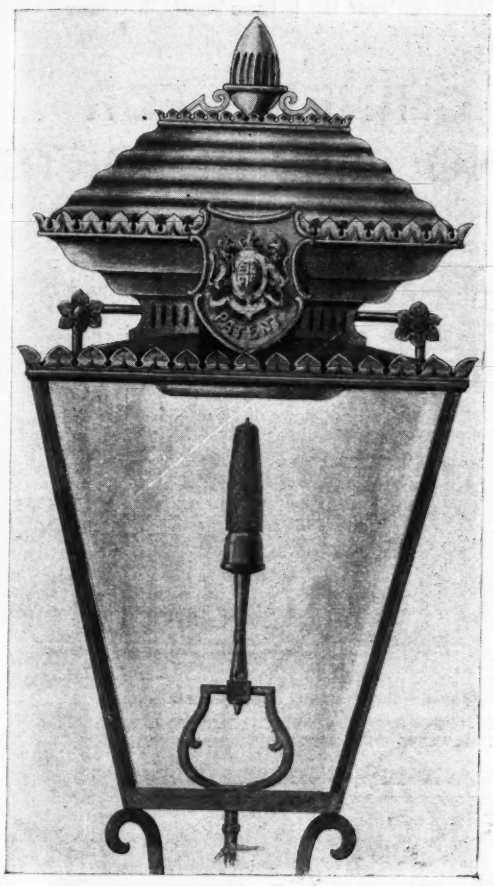






See next Week's Advertisement for Steam-Pumps, Tar and Liquor Pumps, &c.

SCOTT-SNELL
SELF-INTENSIFYING LAMP.



SIZE NORMAL.

Automatic Action.

No Complex Mechanism.

"Power" Free of Cost.

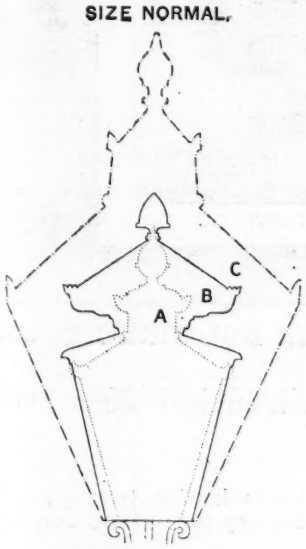
INTENSIFIED LIGHT

WITHOUT Compressing Plant, Special Gas-Service, Water Bill, Gas-Engine or other Pumping Appliances, tearing up of Roadways, or interference with existing Service.

The **SCOTT-SNELL LAMP** may be set to give any pressure from 4 inches to 36 inches of Water; 8 inches to 10 inches is usually preferred.

400-*CANDLE POWER OBTAINED FROM A SINGLE BURNER.*

Lanterns supplied with Single, Duplex, or Cluster of Burners.



SCALE DIAGRAM.
A. Ordinary 16-inch Street Lamp.
B. Scott-Snell Self-Intensifying Lamp.
C. Ordinary Refuge Lamp.

HIGH-PRESSURE LIGHTING HAS COME TO STAY.

Orders for Trial Lamps will, as far as possible, be executed in rotation.

The Lamps are being made by Automatic Machinery, similar parts interchangeable, minimum of hand labour.

THE LAMPS MAY BE INSPECTED AT ANY TIME BY APPOINTMENT.

THE SCOTT-SNELL SELF-INTENSIFYING GAS-LAMP COMPANY, LTD.

Telephone No. 559 Westminster.
Works: 29, GILLINGHAM STREET, S.W.

53, Victoria Street,
WESTMINSTER, S.W.

WEST'S GAS IMPROVEMENT CO., LTD.,

ALBION IRON-WORKS, MILES PLATTING,

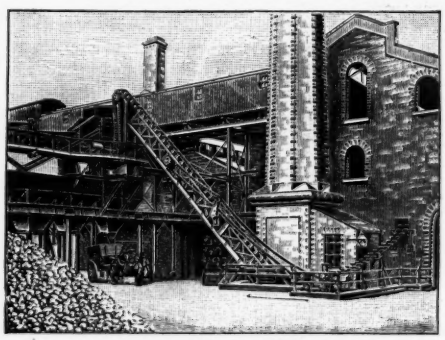
And 104, QUEEN VICTORIA STREET, LONDON, E.C. **MANCHESTER.**

SOLE MAKERS OF

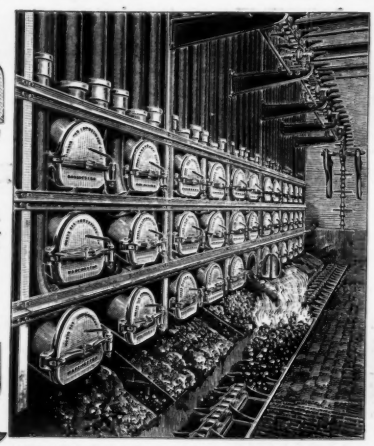
WEST'S STOKING MACHINERY FOR CHARGING AND DRAWING GAS-RETORTS.

ALSO

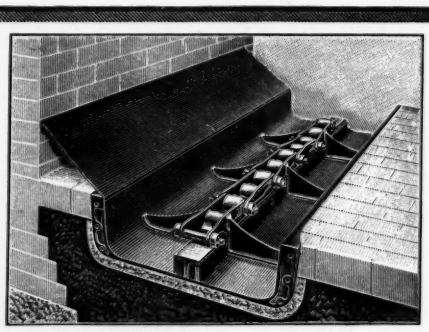
WEST'S PATENT SILENT COKE CONVEYOR



VIEW SHEWING END OF COKE CONVEYOR, ELEVATOR AND CONVEYOR FOR STORING COKE IN HOPPERS AND COKE YARD.



INTERIOR OF RETORT HOUSE SHEWING COKE CONVEYOR.



SECTION OF COKE CONVEYOR.

Silent in Action. Simple Wearing Parts. Does not make Breeze.

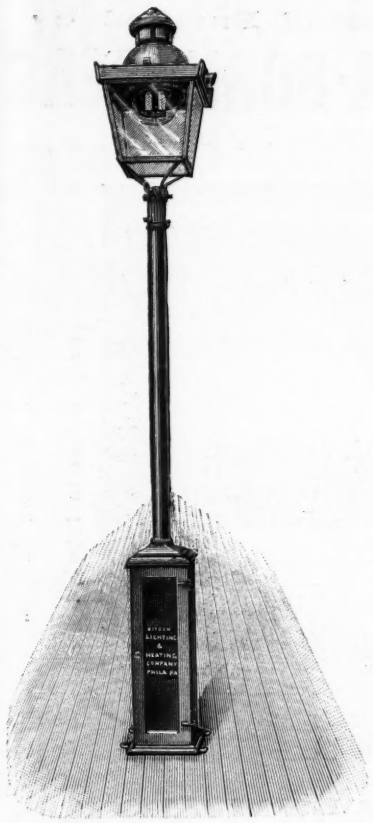
SPECIALLY ADAPTED FOR CONVEYING, ELEVATING, AND STACKING HOT COKE FROM GAS-RETORTS OR COKE-OVENS.

The Conveyor after leaving the Retort-House may be arranged to rise up an incline to any required height, and the Coke delivered from the Conveyor to the Coke-Store from any part of the Conveyor.

ALSO MAKERS OF

West's Coke Breaking, Sorting, Sizing, and Screening Machinery.
West's Patent Inclined and Horizontal Regenerator Settings.
Coal-Handling Machinery for Gas and Electric Light Works.

GAS AND GENERAL ENGINEERS.



THE

"KITSON" OIL LIGHT

(VAPORIZED PETROLEUM BURNT WITHIN A MANTLE.)

1200-Candle Power, 1d. per Hour!!!

For Streets, Stations, Yards, Factories, &c., &c.

A System of Lighting surpassing all others in respect of

EFFICIENCY AND ECONOMY.

Self-contained Lamp-Posts.

No tearing up of the Thoroughfares.

See Professor Lewes and Dr. Boverton Redwood's Joint Report.

("JOURNAL," *Feb. 5, p.* 338.)

KITSON LIGHTING AND HEATING SYNDICATE, LIMITED,

BLACKFRIARS, LONDON, E.C.

Telephone No. 109. Telegraphic Address: "ELEVATOR, HASLINGDEN."

S. S. STOTT & CO.,

ENGINEERS, HASLINGDEN, NR. MANCHESTER.

COAL AND COKE ELEVATORS & CONVEYORS.

COAL AND COKE STORAGE PLANTS.

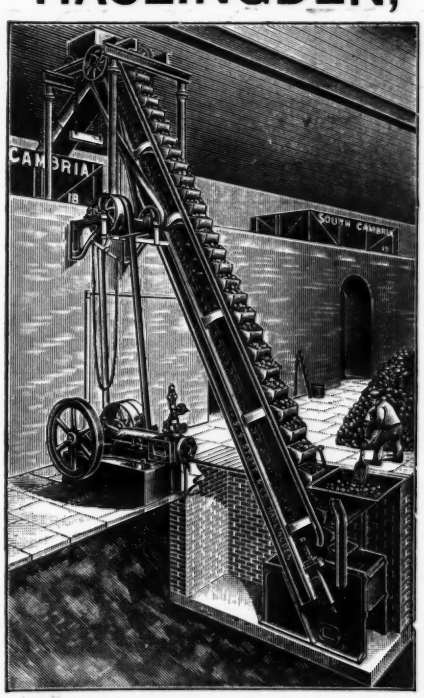
COAL AND COKE BREAKERS.

WHARF ELEVATORS FOR UNLOADING BARGES.

ELEVATORS & CONVEYORS for BOILER-HOUSES.

STAMPED AND RIVETED STEEL ELEVATOR BUCKETS.

DETACHABLE CHAINS AND SPROCKET WHEELS.



LIME AND OXIDE ELEVATORS & CONVEYORS.

HIGH-CLASS STEAM-ENGINES up to 1000-Horse Power.

PUMPS, HORIZONTAL AND VERTICAL, SINGLE, DOUBLE, or THREE-THROW, for WATER-WORKS, &c.

BEAM PUMPING-ENGINES.

AIR-COMPRESSORS.

BELT PULLEYS, ROPE PULLEYS, GEARING, &c., &c.

Coke Elevator Loading Railway Waggons.

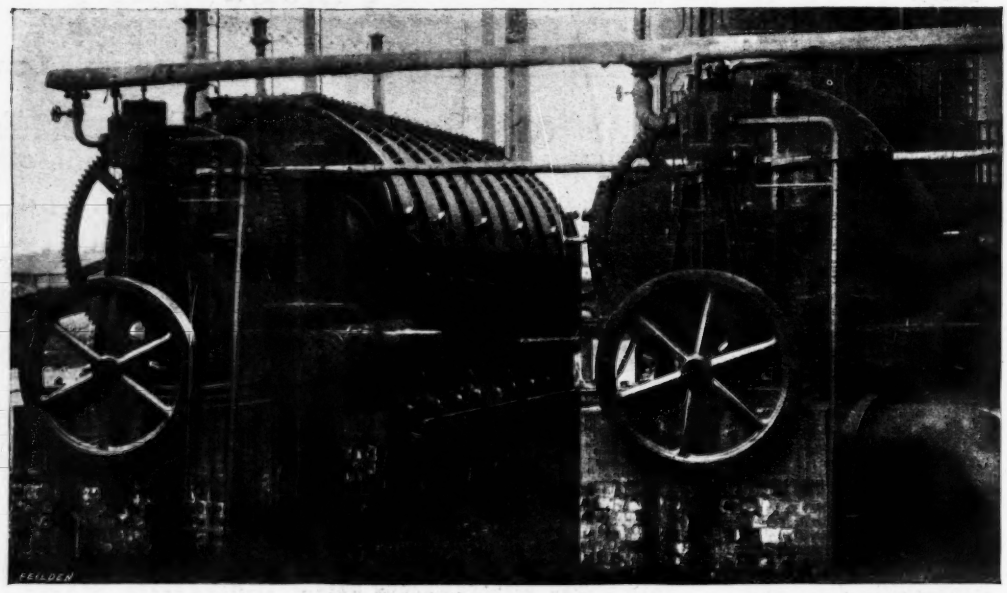
642,000,000

Cubic Feet of Gas per day are now being Purified by

PATENT "STANDARD" WASHER-SCRUBBERS

which extract ALL the Ammonia and a large proportion of the CO_2 and H_2S.

Prevention of Slip of Gas Unwashed.
Strength of Liquor Concentrated.



Maximum Washing Surface.
Easy access to interior.

KIRKHAM, HULETT, & CHANDLER, LD.

PALACE CHAMBERS, BRIDGE ST., WESTMINSTER, S.W.

S. CUTLER AND SONS, MILLWALL, LONDON.

GASHOLDERS

OF EVERY SIZE AND DESCRIPTION

CUTLER'S PATENT GUIDE-FRAMING

HAS BEEN ADOPTED FOR MANY IMPORTANT HOLDERS.

Carburetted Water-Gas Plant.

SPECIAL DESCRIPTIVE CATALOGUE ON APPLICATION.

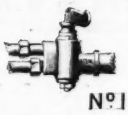
PATENT WATER-TUBE CONDENSER

Over 120 now in use.

Cutler's Patent Freezing Preventer

For keeping Cups of Gasholders free from Ice.

CHARLES HUNT PATENT GAS-WASHER.



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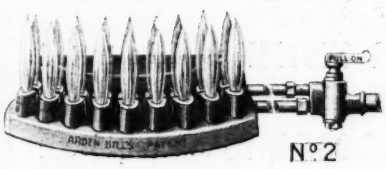
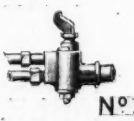


No 2



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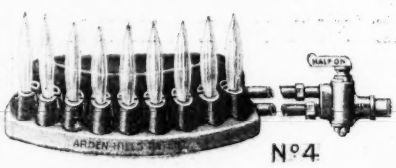

No 4

No. 1. Tap off.
No. 2. Burner and Tap full on.
No. 3. Showing position of Lever in Tap when three quarter on.
No. 4. Burner and Tap half on.

A NATIONAL ECONOMIZER.

THIS IS THE

PATENT "ACME" DUAL BURNER AND TRIPLEX TAP,

WHICH IS FITTED IN

ARDEN HILL & CO.'S GAS-FIRES.

CHIEF ADVANTAGES.

1. Consumption of Gas reduced 50 per cent.
2. When half on, same appearance as full on.
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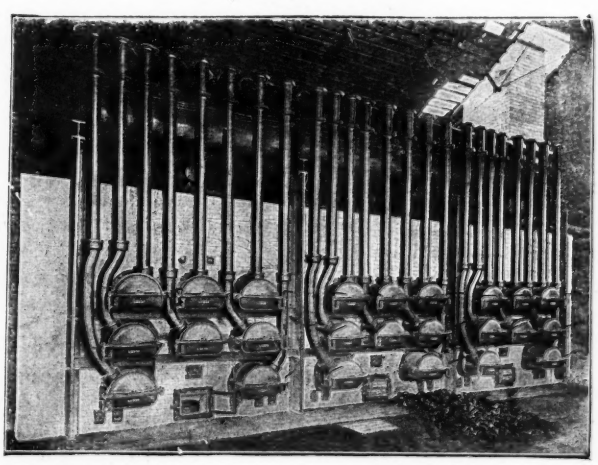

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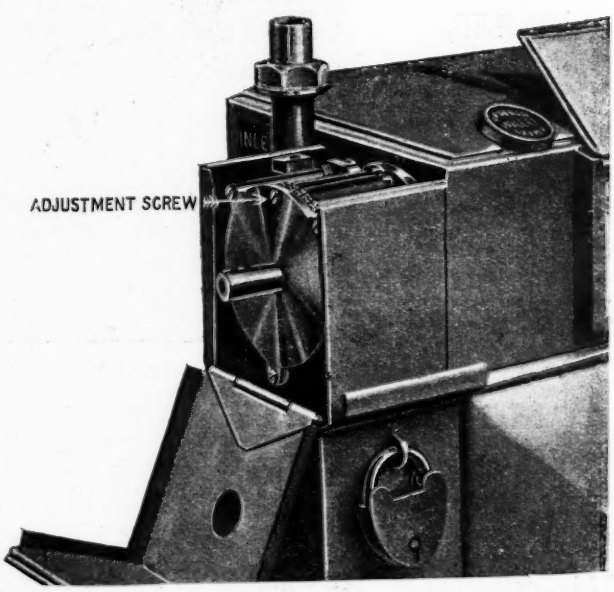

3rd. Turn loose Ring until number of feet required is opposite arrow, replace Adjustment Screw and Re-seal.

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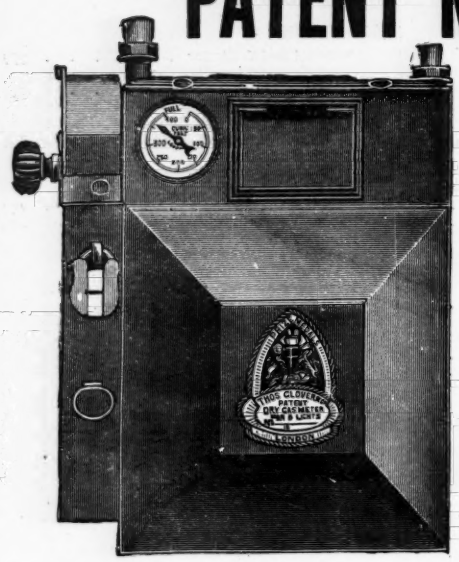

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JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

VOL. LXXVII., No. 1970.——TUESDAY, FEBRUARY 12, 1901.

EDITORIAL NOTES.

The Meetings of the Gaslight and Coke Company.

THE two meetings of the Gaslight and Coke Company on Friday passed off with a quietude that was very remarkable, in the circumstances. The British way of working railway, gas supply, and other big company enterprises, is astonishing. The theory of complete and immediate responsibility of the directors to the general body of proprietors co-exists with the fact of the utter helplessness of the latter in the hands of the former. For all the practical good they do, with respect to the control of the undertaking, the general meetings of shareholders might as well be given up. If the concern is going headlong to ruin, the assembled proprietors cannot save it. If it is prosperous and well managed, no thanks are due to the shareholders. In the case of statutory companies, Parliament, and the public served by these organizations, are just as powerless to mould their character. The British public has ample experience of this in the Southern Railways. Anything more discreditable to the reputation of the nation for business aptitude than the history of these important lines, could not be conceived by the most imaginative foreign traducer of the English people. During many years, everybody could see plainly that these railways were steadily going from bad to worse; and yet nobody could put them in the right way. Now their case is past praying for. The country is burdened with these awful examples of persistent mismanagement, and it cannot get rid of them. Yet the Directors boast in print that they are "satisfied with, and grateful for, the confidence of "their shareholders." Upon which "The Times" remarks: "Perhaps they are wise. If the shareholders are content "with the business capacity and common sense of the "Directors, there is no more to be said."

The foregoing observation might be repeated with reference to the Gaslight and Coke Company. It is only fair to the Governor to record the circumstance that he received on Friday a warmer encomium than usual upon his conduct in the chair; while the meeting seemed to be quite overpowered with a sense of the ability with which the affairs of the Company have been administered by the Board and by everybody concerned. The complete absence of any discussion, either of the matter of the report and accounts or of the proposals of the last Bill of the Company, must be taken to mean the same. Not a single question was put to the Chair after the usual address, which nevertheless contained some rather remarkable admissions and accusations. The business of the ordinary meeting was over in about half-an-hour. When it came to be a question of the Bill, and nothing but the Bill, unanimity—or possibly resignation—equally ruled the assembly. The Governor told how, last autumn, the Board had had to eat the parliamentary leek; and the proprietors gave up without a murmur the 5s. per cent. which they were invited to relinquish by way of atoning for past capital losses. A few questions were asked as to the application, duration, and method of working this new redemption fund; but nothing like criticism of the policy of the Board made itself heard. Half-an-hour saw the Bill through the extraordinary meeting. The Governor almost wept over his relief from the perilous passages of the day.

This was all very nice and gratifying to the Administration, naturally; but, unfortunately, the business is not yet at an end. The proprietors can do no other than acquiesce, sombrely or otherwise, in whatever the Board say is good for them. They have been so habituated to opening their mouths for maximum dividends, and shutting their eyes to the conditions under which these returns were obtained, that the attitude has become fixed upon them. Yet others, reviewing the proceedings at Friday's meetings, will find plenty to comment upon. The most striking of all the Governor's statements in moving the adoption of the report and accounts were those relating to the Company's financial position. He confessed that the last stock issue was an utter failure. (Curiously enough, the whole of this part of the address was omitted from "The Times" abstract report, so that "the "City" is deprived of its usual means of acquiring information concerning this important phase of the situation.) A small proportion of the amount offered was placed at a fractional advance on the reserve price, which was par; but a good deal of it was unsold. The actual figures given by the Governor were as follows: The amount offered for sale by tender was £125,000; sold, £48,055, at an average price of £100 3s. 8d. per cent. The next proceeding was, according to law, the offer of the residue to the shareholders at the reserve price—with the astounding result that only £38,755 was taken up. This, be it remembered, was a 4 per cent. stock of a statutory Gas Company actually paying a higher dividend on capital stock amounting to over 15 millions sterling. What a miserable response from all those millionaires popularly supposed to be so peculiarly well represented on the Board of the Company! Why did not the Directors take up the balance of the issue themselves? Had they not sufficient confidence in the investment? After this amazing transaction, it ceases to be a mystery that the subsequent attempt to raise capital had to be relinquished by reason of the stock falling to a discount; and the Board found themselves within measurable distance of having to ask for the forbearance of the proprietors in waiting for a short time for their dividends. The Company's bankers accommodatingly lent the money; but, as it appears, at the rate of 5 per cent. Borrowing at 5 per cent. to pay a dividend after the rate of £4 8s. per cent., while less than 3½ per cent. has actually been earned, may be sound business, but it has an odd look.

Having failed, as capitalists, to meet the financial emergency, how does the Chartered Board stand as a body of administrators faced with an arduous parliamentary position? After their second repulse, last session, the Governor tells with much candour how they bent to the uncongenial task of making their account with the parliamentary forces which they had previously set at nought. The result is the pending Bill—a very cleverly-designed measure, as we have already admitted. The Governor's exposition of the new scheme of legislation was also extremely clever. If a fault must be found with this effort, it can only be that it was all too clever. Nothing need be said about the prudence of the resolve to ask for the million so badly needed in the form of debenture stock; the remaining ordinary stock being unissuable. But while listening to the official recommendation of the novel capital redemption project, and the puzzled shareholders' inquiries on the subject, and not failing to note that the Governor passed over the obvious difficulty of how the Company could deal in its own stock, the impression grew that the simpler course of consenting to lower the standard price 3d. would have been far preferable. As we have already explained, and the Governor told the meeting, the proposal of the Bill in this regard is tantamount to knocking 2½d. off the standard price. One of the proprietors, amid sympathetic laughter, brushed aside the thin pretence that what they were asked to give up in the way of dividend is a temporary sacrifice. "We shall never," he said, "get "it back again." That is obviously true. And, therefore, the only question worth asking at the present juncture is: Having decided to eat the leek, why not do it with a good grace, and take it as offered by Parliament? What is the use of straining at the odd halfpenny? The Company will be met with a demand for greater sacrifices than this; but if so much is offered, the Bill as amended will go forward with the advantage of plainly conforming to the declared opinion of Parliament. That is, briefly, how the issue appears to stand. If the Company are to save a shred of their old extra sliding-scale dividend, they will have to agree with the opposing forces as quickly as possible. Honestly, there does not seem to be much prospect of this. The Administration have had a fine fling since 1876; but the long rope has come to the inevitable end at last.

A Further Weakening in the Coal Market.

THE cold weather that has prevailed of late in the Midlands and the North has somewhat revived the house-coal trade; but so far as coals for manufacturing, shipping, gas making, and other industrial purposes are concerned, the market continues to weaken. The Scottish coalowners reduced

their official quotations during the past week, as they find that orders are now less plentiful than cargoes, and an active and healthy competition is springing up between them and the North of England collieries. The following figures will give some idea of the extent to which prices in Scotland have fallen away since the height of the "boom" last year. In January, 1899, the price of splint coal (the description used for gas making in Scotland) was quoted as 9s. 9d. to 10s. per ton. By the following November the price had risen 2s.; and in January, 1900, it stood at 13s. to 14s. The figure rose to 15s. 6d. in February, to 15s. 9d. to 16s. in June, and to 17s. to 17s. 6d. in August, when the top was reached. The November quotation showed a fall to 14s.; and at the present time the price is put at 11s. to 11s. 9d., or about 6d. a ton lower than in November, 1899 (when the rush for coal was just beginning), and only 1s. 6d. higher than the figure of two years ago. The coal crisis is ended for the gas undertakings of Scotland.

A similar fall has taken place in English gas coal, which is several pence lower again this week—being quoted at from 10s. 6d. to 11s. per ton f.o.b. Tyne; while it is admitted that the lower figure (10s. 6d.) is the one at which sales are actually being effected. The price has not to slip back much farther to reach the figure at which the 1899-1900 contracts were closed, though it is still some shillings above the level of the middle nineties. When we add that the fall that has already taken place has come about before any reduction in the exports of coal has been recorded, the hopefulness of the situation is rendered more emphatic. Last month, the total shipments of coal, coke, and patent fuel—the figures are, we are pleased to see, in future to be divided each month under these headings, instead of only the aggregate being given—amounted to 4,236,400 tons, as compared with 4,000,686 tons in the first month of last year; so that, although the difference is but small, it is an increase and not a decrease. As there are reasons to expect a falling off rather than an increase in the exports during the coming months, while the output continues to expand and the consumption in the iron trades to contract, the probabilities are all in favour of lower prices.

The Board of Trade returns bear no uncertain marks of the slackening of business, although some financial journals that ought to know better have hailed the increases in the value of both imports and exports as a proof that trade is not falling off. The truth is that the enhanced values in both cases are due entirely to higher prices; the volume of trade both inward and outward being really less than a year ago. In the case of iron and steel, there is a reduction in value as well as in quantity, though the latter shows by far the greater decrease. The shipments of iron and steel last month amounted to 205,086 tons, valued at £2,185,776 (or, at 1900 prices, £1,692,000), as against 331,183 tons of the value of £2,729,478 in January of last year. It is worthy of note, as indicative of the effect of foreign competition, that, while the exports of unwrought steel last month were 14,669 tons less than in the corresponding period of 1900, the imports of unwrought steel were 15,598 tons more. Similarly, the exports of pig iron this year show an enormous reduction (46,281 against 130,246 tons); whereas the imports rose from 9363 tons in January, 1900, to 20,194 tons last month. In other words, the demand upon our steel makers was reduced by 30,267 tons, and that on our pig-iron makers by 94,796 tons, apart entirely from any reductions in the home demand through slackening trade. These figures only bear out the truth of what has been stated in these columns again and again the past few months, that the high prices of 1900 have choked the life out of trade.

Signs of the approach of another predicted result of the recent spell of abnormal prices are not wanting. We refer to the probability of friction between employers and employed over wages and other matters. The Scottish miners are being asked to concede a reduction of wages from 8s. to 7s. a week; and if their intentions be as bellicose as their words, which is somewhat doubtful, there will be trouble. We incline, however, to think that it will not be in the earliest stages of the downward movement of wages that the greatest opposition will be met. What may prove a much more serious matter is the proposed new policy of the Miners' Federation in regard to the Eight-Hours Question, to which we called attention last week, and which is now declared to have been deliberately adopted by the whole Federation. The proposal is that the miners shall first ask that a conference of representatives of all the coalowners and miners of Great Britain be called together, in order that the men may make a united request for the grant of an eight-hour day "from "bank to bank," which is, of course, a different matter from an eight-hour working day. Should the masters decline to attend such a conference, or refuse thereat to grant the men's request, a ballot is to be taken of the miners in the federated areas, on the question of whether they are in favour of declaring a strike in order to enforce their demand.

Such is the programme as expounded by the Vice-President of the South Wales Federation, who adds: "It will be "a national, not a sectional effort; and, if there is a fight, "it will, of course, be a general one." We are not so sure about the "of course." We do not quite understand how it is proposed to induce the large number of miners who do not wish for the eight-hour day to come out on strike in favour of it. It would, however, be a sufficiently serious matter if all the Federation men should commit themselves to such a struggle. The course of events will require watching; but we are by no means sure that the whole thing is not an elaborate piece of bluff, designed, but hardly likely, to influence Parliament in favour of the Eight-Hours Bill.

The Commercial Gas Company's Public Lighting Contracts.

The report of an interesting case for gas companies and public lighting authorities appears in another column. It is the first stage of a dispute between the Commercial Gas Company and the Corporation of the Borough of Stepney, over the asserted right of the Company to raise the price of gas supplied to the street-lamps without notice. The public lighting service is done by the Company for an inclusive sum per lamp per annum; and when the Company found it necessary to raise the charge for gas in the course of last year, they also added a proportional amount to the bill for the public lighting. The Corporation disputed this higher charge, and tendered payment at the old rate, which the Company refused to take in full discharge. Consequently, the money has been held over; and this circumstance was considered by the Court in dealing with the question of costs. The legal argument turned upon the question of the existence and nature of a contract between the parties; one contending that there was a virtual contract for doing certain things for an agreed price, the other arguing that the question of price was governed throughout by the sliding-scale clauses. The Magistrate strove to keep the issue rigidly confined within the four corners of the statute, although there were, of course, some qualifying admissions on both sides. One of these was the fact that on previous occasions when the Company had raised the price of gas to the private consumers, they had not increased the charge for public lighting. On the other hand, the Local Authorities had received remissions of charge, on application, when the price of gas had been reduced. Taking one consideration with another, therefore, the Court held that the contract between the Company and the Corporation was a yearly one, and covered the price of gas as well as the other elements of the bargain. The Magistrate has been asked by the Company to state a case for the Superior Court; so that a final decision has not yet been arrived at. The matter is not one of great seriousness, as between two public bodies; but it will be well to have it disposed of on the best possible authority.

The Institution of Gas Engineers—Glasgow Engineering Conference.

The Annual General Meeting of the Institution of Gas Engineers was held on Saturday, the President (Mr. J. W. Helps, of Croydon) in the chair. The business of most general interest that cropped up on this occasion was the announcement of the President relating to the proposed holding of an Engineering Conference in Glasgow early in September, during the Exhibition. Further particulars of the gathering will be published in due course; but it is not too soon to warn those who may have to make their summer arrangements early, of the date of this interesting fixture. It appears from Mr. Helps's story that a considerable effort is being made to ensure the success of the conference; and it is to be hoped that the Gas Engineering Section will not be overshadowed by any others. It is satisfactory to learn that the Gas Institute is to be officially represented on this occasion. By a happy coincidence, the President-Elect of the Institution is Mr. Walter R. Herring, of Edinburgh; so that the unity of Scotland in supporting the conference and the Exhibition is pleasingly illustrated in his case. A strong programme for the conference ought to be assured as the fruit of the efforts now being put forward by Mr. Livesey,

as the President of the Gas Section, and Mr. Helps, as the Honorary Secretary; but it should be made clear that whatever is done in this connection ought to be in addition to, and not in substitution for, the ordinary work of the technical societies. Unless care is exercised in this regard, it is to be feared that one or other interest will suffer by the competition.

More Work with the Portable Photometer.

THERE are, notoriously, two ways of looking at everything; and more than two in most instances. This is peculiarly the case with regard to such matters as the proceedings of public bodies, which may usually be described as extremely satisfactory, or intolerably objectionable, according to the point of view. The London County Council, as is well known, have a toy called the portable photometer, which they expect the officials of their gas-testing department to play with occasionally. There have been several makes of this device, and various kinds of fittings have from time to time been used with it; but of this the Council naturally say nothing. They have now, it seems, secured possession of an instrument which agrees better with the standard apparatus in use at the statutory testing-stations than the amusing arrangement whose indications failed last year to impress a Parliamentary Committee. Consequently, the results of the peripatetic testings are not so ludicrously out of keeping with those made daily at all the gas-works and the public testing-stations as were the first batch that, taken by stealth, blushed into Fame last year.

Nevertheless, some of the results, and, still more, the observations of the Public Control Committee upon them, are curious enough. Marvellous to relate, the November tests of the Commercial Company's gas "when the output "of the Companies is very large," never once fell below 16 candles! And this "notwithstanding" the brisk draught on the mains! The remarkable discovery that during the latter half of the year the averages of the tests made in the Commercial district by the portable and the statutory photometers fairly agreed, is cited as proof that when the two instruments are of "precisely the same character," and the gas is "of the same illuminating power," "the results ob-"tained outside are in agreement with those obtained within "the testing-places." There's logic! When the tests happen to agree, they do agree most satisfactorily. What more do you want? The concluding remark of the Committee is delicious. They discover an improvement in the illuminating power of the gas supplied to London during the latter half of the past year; they hope that the improvement will continue; and, with praiseworthy reticence, they admit the difficulty of deciding how much of this improvement may be ascribed to "the action taken by the Council immediately "before the improvement occurred." This ingenious hint that the cost of the Council's Portable Photometer Bill was not wholly thrown into the gutter, is probably designed for electioneering purposes. It is an idea a little "too bright "and good for human nature's daily food." Are the Council quite sure the mild weather was not a more potent influence? Anyhow, something enabled the South Metropolitan Company to save considerably on their carburetting during the same season; but we cannot be certain that it was the Council's portable photometer.

Lessons from our Competitors.

WE conclude to-day a series of articles in the nature of general reflections on problems connected with the successful management of business concerns, suggested by the consideration of some of the circumstances attending the advent of American manufacturers into the world's commercial markets. How far the trade of this country will be thereby affected is a matter of considerable controversy at the present time; but that new factors are introduced into the industrial problems of to-day cannot be denied, and the subject is one worthy of thoughtful consideration by all. There are one or two points, dealt with more fully in the articles to which we have referred, which may here be emphasized.

The first is that, from the consumer's point of view, the competition of the United States is most welcome. Its advent has pricked the bubble of high prices for iron and coal in the most effectual manner, and the fear of it will serve as a no mean preventive of undue inflation of prices in the future. Moreover, as the competition to which they are now subjected—by manufacturers whose plant is the most efficient possible, and whose commercial methods are conspicuously successful—will force the iron, steel, and machinery makers of this country to increase the efficiency of their works and of their management, and thereby reduce the costs of production, the gain to the consumer will be an enduring one.

Another point upon which we wish to lay stress, is that the experience of the English manufacturers at the present time, as well as its causes, has lessons for the gas industry. Many, in fact most, gas undertakings are now, and have for some time been, subjected to active competition; though certain good people were long in realizing the fact, if they have even yet fully done so. The way that competition is to be met is indicated by some of the methods adopted across the Atlantic for the purpose of successfully engaging in conflict with the English manufacturers. One of these methods is the wide adoption of labour-saving appliances; another, which does not lie in the power of gas companies to effect, but is in their power to advocate and agitate for, is the cheapening of transit costs by the increased capacity of railway waggons. The saving that might be effected in the cost of coal by the use of waggons made capable of carrying twice their present load by doubling their height, would be no inconsiderable matter to companies obliged to obtain their supplies from a distance by rail.

A further special feature of American methods that calls for particular notice, is the practice of selecting for responsible positions capable young men. We are told that the great Carnegie Steel Company—for his 54 per cent. share in which Mr. Carnegie has just accepted the respectable sum of $400,000,000—is managed by a young man who was only thirty years of age when he was appointed to the position, and that all the big concerns in the States are entrusted to men in the early prime of life. The slow-going safety-at-any-price good folks who are among the inhabitants of the gas world in this country, and who are afraid of doing anything new for fear of making a mistake—and therein make the greatest of all—stand aghast at the idea of a man of thirty taking charge of a commercial undertaking bigger than a chandler's shop. Yet surely, if a man is ever going to do any good at all in life, he has the ability to do it at thirty, and possesses besides, what he will not probably have at fifty, energy, enterprise, and initiative.

But, it is said, the young man is without experience. Well, of course, we are not advocating the putting of raw youths into responsible positions. Some men do not take either business or life seriously until far on in years; others are serious, thoughtful, and level-headed by the time they are five-and-twenty. And our point is not by any means that all young men are better than their elders, but that the man who would make a good manager at fifty would, in nine cases out of ten, probably make a much better one at thirty. Given the right stamp of man, he will have had sufficient experience by that time to provide him with ballast—for we assume that his employers would have earlier promoted him to responsible work—and then, with the experience of others to study, the young man will be fully prepared to profit by that personal experience which the actual performance of duties can only give to the man who has to fulfil them, at whatever age he may begin.

The Liverpool Tramway Accident.

POSSIBLY those people who have been clamouring of late for the municipalizing of everything, will stop and think a bit after hearing of the terrible electric tramway accident in Liverpool. Not, of course, that the circumstance of the Liverpool electric tramways being Corporation property had aught to do with causing this dreadful mishap; but he must be singularly dull or prejudiced who does not see that the Corporation Tramways Committee took the occurrence very much more coolly than a company dared have done, with the local authority looking on in the public interest. Not only so, but the same attitude was repeated by the neighbouring Manchester authorities, as the "Manchester Guardian" very properly pointed out, in an article appearing on the 7th inst. The Chairman of the Manchester Tramways Committee frankly admitted that the overhead electrical equipment of the lines would involve the risk of accidents similar to the Liverpool fatality. Yet the City Council took no notice of the admission, as they certainly would have done if the proceedings of a company had been in question. From this it appears that there are other things besides gas photometry which go out of fashion when municipalities venture into supply businesses. It is a pity the amateurs of the municipalization of all public services do not ponder a little oftener over the force of the old query which begins *quis custodiet*. We are aware that, by the British Constitution, the King

can do no wrong; but this immunity can hardly be extended to British municipalities. Yet the "Manchester "Guardian," which lives under the shadow of much Municipalism, is driven to remark that: "It is time that the City "Council, which is introducing the source of danger, should "display a clearer sense of its responsibilities." But to whom will the Manchester Corporation report themselves, on this or any other matter of municipal trading? Some of the details of the Liverpool catastrophe do not make very pleasant reading. That story, for example, of a poor fellow lying in the snow for twenty minutes, with electric flames bursting from him, and crying piteously, in vain, for somebody to "take it away," until death ended his sufferings, should be enough to shake the corporate soul even of a Corporation Committee. Such a record heavily handicaps that great American invention, the overhead trolley wire.

WATER AFFAIRS.

Improved Quality of London Water.

THE money expended by the Battersea Borough Council and the Southwark and Vauxhall and Lambeth Water Companies in connection with the recent inquiry before the Railway and Canal Commissioners, reported in the "JOURNAL" a fortnight ago, will not have been altogether wasted if it has brought home to the minds of members of the other Metropolitan Councils and the general public the fact that the water supplied to them is not the "dilute sewage"—the germ-laden and disease-carrying liquid—which certain parties have, for their own purposes, tried to make them believe it is. The witnesses for the Companies attacked were able to show to the satisfaction of the Commission that everything possible was being done to ensure the distribution to the consumers of pure and wholesome water; and the Court acknowledged their inability to make any order. If any further proof be wanted that the Companies specially concerned, as well as all the others, are keenly alive to the importance of efficient filtration, and consequently do not require any spurring on by officious local bodies, it will be found in the last report presented by Sir William Crookes and Professor Dewar to the Official Water Examiner for the Metropolis. It is there shown that during the past year these eminent Chemists examined, on behalf of the London Water Companies, 6731 samples of water by the bacteriological method, compared with 4792, 3500, and 3249 samples in the three previous years. They also carried out 2478 chemical analyses; making altogether 9209 samples dealt with. In the first six months, the clear-water wells of the Thames Companies contained on an average 24 bacteria per cubic centimetre; while the New River and Lea supplies contained respectively 9 and 8 bacteria. In the second six months, the numbers were 18, 8, and 12; the mean for the year being 21, 9, and 10. The following figures, for the three preceding years, will show the steady improvement which has been effected by the Companies. In 1897, filtered Thames water contained 46 microbes; New River water, 32; and Lea water, 62. In 1898, these figures were brought down to 34, 30, and 25; and in the following year to 27, 15, and 20—being very much below the 100 microbes per cubic centimetre which is taken by Sir William and his colleague as an indication that the Companies require a gentle reminder that their filters are not working at their best. This vigilance, with a subsequent "tightening of "the screw" with better work, has produced the results given above. They show that last year, as compared with 1897, the average microbic purity has been raised about 55 per cent. in the water derived from the Thames; while in that taken from the New River it has gone up to the extent of 70 per cent., and in the case of the Lea water of nearly 85 per cent. These extraordinary results are attributable to the increased knowledge of the scientific treatment of the filter-beds, and to the fact that, as bacteriological examinations of each of the Companies' supplies are made every day, those who conduct them are in a position to communicate immediately to the Engineers any retrograde change that may be taking place in the efficiency of the filtration. The testimony afforded by the above-named distinguished Chemists to the excellent character of London water cannot be too generally made known; and therefore it is gratifying to find that, after an existence of twenty years, their monthly reports are at last receiving notice in the popular Press.

Water War at Stockport.

FOR the past few weeks the town of Stockport has been in a turmoil over the subject of the water supply of the borough and the adjacent districts. It may be remembered that about two years ago the Corporation hankered after the undertaking of the Stockport Water Company, and applied to Parliament for power to purchase it. The proposal met with opposition from the neighbouring Local Authorities, who were treated somewhat cavalierly by the Corporation; and the result was that they had some difficulty in getting their Bill through. They succeeded, however, but only on the condition, insisted upon by Lord Camperdown, that the surplus profits, after a reserve fund of £10,000 had been formed, should be applied in reduction of the water-rates, and not, as the Corporation had proposed, carried to the district fund, and that the charges for the domestic supply were to be the same all over the area. The purchase was effected under these conditions at a cost of about £800,000; and it was considered at the time that the works and sources of water would be adequate for many years to come. As the Act sanctioning the transfer was only passed in the session of 1899, it may well be imagined that the ratepayers were not a little surprised to find last November that the Corporation purposed applying to Parliament for power to carry out an extensive auxiliary scheme (estimated to cost as much as the original purchase), which no less an authority than Mr. James Mansergh had advised them must be taken in hand at once, and which, in fact, ought, he said, to have been included in the Purchase Bill of 1899.

The proposal caused a great outcry; and the local paper has been full of correspondence—mainly from one member of the Corporation—condemning the scheme, and contending that the needs of the borough can be supplied from existing sources and by obtaining water from the Manchester Corporation under powers already granted. A suggestion was also thrown out, and was strongly advocated, that the matter should be delayed for a year, in order that the possibility of the formation of a Water Board, consisting of the Corporation and all the Local Authorities concerned, who would be able to deal with the question of the water supply of the entire area, and the equitable distribution of the charges, might be discussed. The suggestion was worth consideration, as it afforded an opportunity of rectifying what has been regarded as a serious mistake; and probably more attention would have been paid to it but for the very definite language used by Mr. Mansergh. The ratepayers were polled on the question, with the result that the scheme has been sanctioned by a majority of 849—its supporters numbering 5598, and its opponents 4749. The counting took place last Wednesday, on which day the Town Council, by 38 votes to 6, formally decided to proceed with the Bill. It is rather curious that the majority should have been so large, in view of the numbers shown by the poll; but the latter cannot be said to fully represent the views of the ratepayers, inasmuch as, out of 14,013 voting-papers delivered, only 11,213 were collected, and of these 2277 were spoiled and unused. After all the local opposition offered to the scheme, the Bill to sanction it is not likely to have a very smooth passage through Parliament, even if it should, in the end, get beyond one House.

Another Point of Law.

THE West Gloucestershire Water Company did well to appeal against the decision of the Thornbury Magistrates in a case in which a consumer was summoned for using, in his trade as a baker, water which was supplied for domestic purposes only. The facts as stated to a Divisional Court last week will be found in our "Legal Intelligence." There was apparently no question as to baking not being a "domestic" use of water. The difficulty arose over determining who were really the suppliers—the "undertakers" in the words of the statute. The vehicles for the conveyance of the water to consumers—the mains and stand-pipes—belonged to the Rural District Council, and were let to the Company, under an agreement, at a purely nominal rent, on condition that they should be kept charged with "pure and wholesome water "for domestic purposes, and not for purposes of trade," for which the lump sum of £30 per annum was to be paid by the Council. In the opinion of the local Justices, this constituted the Council the suppliers of the water; and they consequently decided that the Company had no cause of action, especially as they were not paid by the defendants. They were, however, doubtful of their conclusion being the right one, and therefore they gave the Company every facility

for stating a case. As will be seen by the report, the Superior Court have taken a different view of the matter, and the Company's position has been clearly defined. The case, which raised an interesting point in connection with the supply of water in bulk, has been sent back to the Justices, with instructions to convict.

ESSAYS AND REVIEWS.

WORDS AS TRADE MARKS.

A SHORT time ago we had occasion to make a protest against the miscalling of articles dealt in by gas-fitters—especially lamps—for trade purposes, and are not without gratifying knowledge that our action in this respect has already had some good effect. Mischief of this kind is more frequently done for want of thought than out of malice prepense. Few people, unfortunately, even of those who have enjoyed the advantage of good schooling, have a sufficient general appreciation of the value of words; while those who have had too exclusively "practical," or "modern," a school training, are apt to ignore the existence of any such element of intrinsic value in the parts of common speech. Now, whatever may be one's individual opinions about the much-vexed question of the relative advantages of classical and commercial schooling, one cannot go very far in business without being reminded, sometimes very disagreeably, that a correct understanding and proper employment of words is a very important matter indeed for everybody. Endless trouble comes from the use of vague, ambiguous, or inappropriate terms in everyday intercourse. Most people are fully aware of this, in a general sort of way; but still a slipshod habit of expression, in speaking and writing, is the rule, and perfect clearness the noteworthy exception.

In matters of commerce and industry, the desire for a ready means of identifying particular descriptions of most large classes of commodities, has led to a remarkable modern extension of the practice of naming special articles. Until anyone tries it, the naming of a thing distinctively, suitably, and conveniently for use and remembrance seems a small and easy task. In reality, it is extremely difficult, as those who have experience of it are usually free to confess. What name is a maker of something which it is fondly hoped will become an article in large popular demand to give to his new speciality? The first impulse of the practical, but unlearned, sponsor will probably be to fall back upon some such "chestnut" as "Acme," "Criterion," "Enterprise," or other appellation which is too hackneyed to retain the smallest distinguishing value. It altogether escapes the worthy tradesman who descends to this weakness of his order, that nobody but himself will ever use his fancy title. Whoever inquired over the counter for a "Lightning" blacking-brush? This large category of the "chestnuts" of trade nomenclature contains a host of mementoes of human fatuity, of every one of which it might truly be said that they have been worked hard enough to deserve to be left to an undisturbed repose. It would be too much to expect that the last "Excelsior" gas-burner has flared out upon a weary and heedless world. But advertisers who might be tempted by the obvious charms of such words, may as well be reminded betimes that there is no longer any reason to hope that they can ever be rescued from the streets and converted into respectable servants of British householders. Their shameless facility is incurable.

Next to the common hacks of trade nomenclature come the deliberate inventions contemplated in section 64 of the Patents, Designs, and Trade Marks Act, 1883, amended by the Act of 1888. We are here lifted into a higher atmosphere of trade politics, wherein the aspiring manufacturer exercises his fancy in naming his productions, under the explicit encouragement of the Legislature. A trade mark, it is scarcely necessary to observe, may possess the virtue of converting into a valuable proprietary article something which would otherwise pass undistinguished. It is seen at its best when used for something which is not the subject of a patent; and the greatest triumph of the inventor of it is to have it taken to readily by the public, and used familiarly as a "household word." Not one trade mark in ten thousand is thus successful. Not to speak for the present of those trade marks which are in fact marks, and nothing more—as signatures, or brands—it is a matter of common observation that the employment of fancy words, with the same object, has greatly increased of late. Let us briefly consider this growing trade custom.

It is dealt with, as already stated, by the Act of 1883, which lays it down as a condition of registration as a trade mark, that a word must be a "fancy word or words not in common use." Exception is made for words so used prior to 1875; so that there may still be current some legalized "Eurekas" or "Electrics," although nobody asks for them by this style. Since the passing of the Act, there has been a great manufacture of fancy names; and Mr. Roger Wallace, K.C., wisely remarks that the more uncommon a fancy name is the better. Yet a very unpleasant fashion has sprung up for calling goods by names which are only fanciful in spelling or the arrangement of syllables, but when spoken have a common English sound and meaning. Last week a case of this kind was heard on appeal from the decision of the Comptroller-General of Patents, by Mr. Justice Cozens-Hardy, at the instance of the Board of Trade; and the result is to be commended to the notice of all manufacturers of specialities. It was a question of the refusal of registration for the word "Uneeda," applied for by a firm of biscuit bakers. The Court interpreted the word as a way of putting forward in one word the three words "You need a." Upon this, it was held that the word was no invention. There is a judgment of the House of Lords which settles the point, unless invention can be sustained. Lord Herschell, in giving this judgment, referred to the example of the words "Phit-eesi," and declared that a combination of common English words is no invention, nor can it be made so by misspelling them. Consequently, when Mr. Justice Cozens-Hardy found in the word submitted to him a mere putting together of the commonest of common English words, conveying to the ear the same idea as the same words properly spelt would have done, he was bound to rule that registration had been rightly and properly withheld.

This important decision is to be welcomed by all who care for the preservation in purity and strength of the English language. It will tend to guard the gas industry from "Dalite" burners, and similar abominations. After all, one may ask, is it worth while for traders to perpetrate these possibly ingenious, but certainly irritating, perversions of common words? There are many people, not over-fastidious in all respects, who simply would not dream of asking over the counter for an article by the absurd name given to it, with misdirected cleverness, by its vain proprietor. It is, of course, wholly different in the case of a named invention such as the "Holophane" globe, which is a good example of apt nomenclature—one of the best, indeed, in technical literature. There are not many other requisites of the gas trades which are known and asked or by their registered names. Makers may call their specialities by any name they choose; but it does not follow that the name will be adopted for use outside an invoice or an order form.

This reflection brings us to observe that, in the general way, specialities are best known by the names of their inventors or makers. The Welsbach light is not in need of any other title to remembrance, although for trade purposes various grades, patterns, and sizes of the fitting have to be recognized. It would be impossible to eclipse the glory of the Welsbach article by parading a "Comet" incandescent gas-burner. This illustration shows at a glance the superiority of the individualistic element in trade nomenclature. Gas engineers know the different makes of carbonizing plant and machinery by the names of the patentees and manufacturers. It is the same with the gas-meter trade; the firms engaged in this industry being conspicuous for good taste in avoiding question-begging appellations for their goods. They do not see the force of styling this make of meter the "Ideal," or something else the "Desideratum;" and their reticence is highly commendable. Although the good old rule that self-praise is no recommendation seems at first sight incompatible with proper trading advertisement, it is not really so. Purchasers will not be cajoled into buying an article because it is called an "I X L" something or other; but they like to see the names and addresses of their favourite makers kept well to the fore.

It is not an empty compliment to the firms in question to testify to the general reticence and simplicity of statement which is happily characteristic of most of the trade advertisements in the "JOURNAL." It is not often that the opportunity is offered for commenting upon this portion of the ordinary contents of our weekly issues. But this happens to be quite pertinent matter to the subject of the present article; and we are glad to place the fact upon record. In all newspapers and technical periodicals, the advertisements disclose the character of the epoch, of the standing of the industry, even more significantly than the editorial and news columns. For the latter may be out of touch with the events and tendencies of the times; but this cannot be the case with the paid-for business notifications. So far as it is possible to judge them by the matter of their advertisements, therefore, the traders in gas-works supplies of the present day are in remarkable agreement in regard to the non-necessity for giving fancy names to their leading specialities. They prefer to let them be known by purely descriptive appellations, or even by none at all beyond their own commercial styles and titles.

To return, in conclusion, to Mr. Justice Cozens-Hardy's judgment. It does not mean that nobody shall henceforward make a fool of himself by offering something for sale by a name which no self-respecting person cares to speak. This folly can still be perpetrated, of course, by the silly and the ignorant, at their own commercial peril. Indeed, it does not matter how idiotic a trade name may be, so long as it is truly a fancy name and an invention, unlike anything else in any language spoken by man. Any and every such trade name that does not offend against a very wide canon of acceptability will be in order for registration; for the Comptroller is by statute eclectic. Only, no punning word, or mere outrage on orthography, will be registered as a trade mark. There is no penalty for using a trade term without registration; but it cannot otherwise be made private property. Here, again, the Courts have happily been able to lay down a rule in accordance with what must be the desire of the educated community. The worst of this class of offences against good taste is that, like puns and parodies, degradations of the English language for trade purposes are fatally prone to stick to the unwilling memory, like burrs; but when they no longer serve the purpose of interested advertisement, the fashion of them may be expected to perish.

AMERICAN ENGINEERING COMPETITION.

[Third Article.]

In somewhat discursive fashion we have dealt with, first the economic effects, actual and possible, of American competition, and then the question of the relative efficiency of management in this country and in the States. Before passing to a consideration of the very important subject of the efficiency of labour in the two countries, we would refer to another aspect of the general question, and that is the economic effect of the gigantic combinations of capital that have sprung into being in the States in the last few years. Will those vast trusts prove ultimately beneficial or detrimental to the industrial interests, and should we benefit by an extension of the principle in this country? They are not easy questions to answer. But it may be said that, in so far as the trusts of America tend to inflate prices to their home consumers, those trusts will eventually inflict injury upon the prosperity of the country; while in so far as (by the elimination of middlemen and by the most complete subdivision of labour and saving of labour possible) manufacturing on a large scale leads to cheapness of production, those trusts will be beneficial in their operation.

There is one fact that must never be forgotten in estimating the relative economy of working on a moderate or on a gigantic scale. That is the absolute necessity of giving to everyone concerned in the management of a business a direct and obvious personal interest in its success. The bigger the undertaking, the less personal supervision can the owner exercise over the details that go to make up the volume of the business. Unless, therefore, there be a devolution of the personal interest in the concern commensurate with the devolution of responsibility, a falling off in efficiency will inevitably ensue. In other words, profit-sharing must be established on a liberal scale among the head officers of a concern to ensure maximum efficiency of management.

As "The Times" Correspondent, whom we have so frequently quoted, puts it: "The average man—whether British, American, German, or French—is so constituted that, if he gets into a position with a comfortable salary assured, he ceases, after a time, to put forward supreme efforts (I am trying to put the matter with least offence), and settles down to doing no more than will suffice to quiet his conscience and keep the business afloat to bring in his salary." That is a truth which is so self-evident that it is wonderful how frequently it is ignored. There are exceptions to the rule, of course. There are men who could never be content to do less than their best, however niggardly the pay; but it would not be just to count upon those exceptions, nor wise to imagine them to be the rule. To apply the principle to the industry with which we are most closely concerned, there can be little doubt that better results would be obtained from a manager whose salary was fixed at (say) £500 a year, but who was awarded a share of the profits which would enable him to earn eight or ten times that amount by attaining to the maximum of efficiency in his management, than would be achieved by a manager paid a fixed salary of £2000 or £3000 a year. And why should a business hesitate to allow its manager to earn £5000 or more a year, if he can only do so by benefiting both shareholder and consumer? What do the public care if the shareholder gets good dividends and the managers good salaries, if they, the public, get a good article at a low price? Do the people who patronize the Aërated Bread Company's shops agitate because the shareholders receive 25 per cent. dividend? Not they; they get what they want at a reasonable figure, and the profits of those who supply the article do not worry them in the least.

We have digressed somewhat from our main theme; but we want to emphasize the fact that magnitude is not everything in business—is, in fact, a positive disadvantage unless accompanied by efficient management. Efficient management achieved, however, is not the whole battle won; there remains the need of efficient labour. It might, of course, be said, with some considerable degree of truth, that only that management is efficient in the highest sense that brings labour up to a reasonably high level of productiveness. But the point we want to consider is whether the average level of efficiency in this country is as high as in America, and, if not, why not.

We have used the word efficient; by that we mean not so much "skilled" as "productive." Few people will dispute the fact that the English workman can equal or surpass in point of skill any other workman in the world. The skilled mechanic from England frequently becomes foreman in the best American workshops; but he has to unlearn all his English ideas as to productiveness. He has to learn that the American workman prefers doing as much work and earning as high wages as he can—to the increased profit of himself and of his master—to the English workman's plan of restricting his productiveness in order to keep up prices and rates of wages, and, as he imagines, to ensure the supply of work being sufficient to give employment to all the members of his Union.

When the subject of American competition was discussed in these columns last year, we gave several very striking quotations from the letters of "The Times" Correspondent, bearing testimony to the readiness of American workmen to adopt labour-saving appliances, and in all ways to increase the *per capitâ* productiveness of labour. The evidence of this correspondent—corroborated as it is by that of every visitor to the factories of America—is, indeed, conclusive as to the greater productiveness of the American workman. The explanation given is that the American workman prefers the benefits of high wages to the delights of lower wages and lower production which their English brethren enjoy by favour of their Trade Unions. Since then the subject has been discussed in several journals; and at the end of last year, the "Spectator" published an article on "The Unproductiveness of British Labour," which led to some discussion in its correspondence columns. No little value attaches to that article, not only on account of the subject-matter, but also because it was written by an avowed believer in the advantages of Trade Unionism.

Says the writer of the article: "We write as those who have always felt a large amount of sympathy with the Trade Union movement, and who have seen with satisfaction not only the frequent successes of the Unions in obtaining for their constituents as a body a full share of the advantages of improved trade, but, even more decidedly, the position of comparative independence in which the individual Unionist workman is placed in dealing with his employer. Speaking broadly, the efforts of the Unions . . . . have in the main been directed with as little of unwisdom and of unworthy motive as could be expected in connection with the policy of any human combinations. Nor have we much doubt as to the result of a balance of advantage from the efforts of organized labour to obtain reductions in the duration of the daily spell of toil."

Yet what does this sympathizer with Trade Unionism, who thinks that its efforts have been wisely directed, have to say about its effects upon the productiveness of labour? "Quite a different view must be taken of the general direction given by, not all but by many, Trade Unions to the attitude of their members during the hours, at whatever limit fixed, of recognized labour. One condition is absolutely necessary to the justification, whether moral or economic, of all efforts to secure high wages or short hours, and that is that, at the rates and during the hours agreed to, every workman should give his most resolute and most efficient work. *Unfortunately, it is precisely the existence of that condition which in a large part of the industries of England the Trade Unions have in practice discouraged.*" A more complete condemnation of Trade Unionism "in practice"—with which, and not with Trade Unionism in theory, we are alone concerned—could not well be indicted.

The writer proceeds to quote the opinions of trustworthy observers who have had opportunities of comparing the British workman with his rivals, and declares that there exists "a body of expert opinion, which cannot be gainsaid, to the effect that, in the industries in which the pressure of foreign competition is most felt, there is a marked inferiority in zeal and diligence on the part of the British workman." It is suggested that much good might ensue if a deputation of British Trade Unionists were to visit America and see for themselves the conditions of trade, and the methods of labour, in the States. In the meantime, those who have any influence with the working classes are besought "to use it for the purpose of inducing them to consider whether they can prudently contemplate setting forth into the new century with unmodified views as to the temper and aims which should inspire them in their work."

This article, as we have said, brought forth several letters, some from the Trade Union point of view; but the balance of evidence and opinion was decidedly on the side of the original contention. A Unionist tried to obscure the truth by pointing out that the rules of no society encourage or enjoin the restriction of output; but that very thin argument was soon disposed of. No one has ever accused Trade Unions of being so foolish as to advertise their methods in that way. But, as a workman of "over forty years' experience" pointed out at once, "there is such a thing as a tacit understanding, which, though unwritten, has still as much the force of law and use as if incorporated in the rules of the society." This correspondent proceeds: "I can aver that in my younger days—that is, before the societies attained such a power in the land—workmen under freer conditions could do, and did, more work and better work than at the present time. . . . If workmen could only be imbued with the enthusiasm for work which they have for play, they would simply be irresistible and carry all before them."

There undoubtedly lies the problem of the future for English employers—how to enlist, more fully and generally, the interest of the men in their work and induce them to attain the maximum of their capacity for production. Of this problem, as of that of obtaining efficient management, the solution lies, we believe, in profit-sharing, on a rational basis, introduced at the right time and in the right way and spirit, and carried out with infinite patience, with tact, justice, and care. Here for the present we must leave this subject that embraces and leads to so many of the problems of industrial life and business management. It has been treated discursively and somewhat disjointedly—not, it is hoped, altogether unprofitably.

The frontispiece of the current number of the Irish financial review "£ *s. d.*" is a well-executed portrait of Alderman W. F. Cotton, J.P., who is High Sheriff Elect of the City of Dublin. It will be remembered that Alderman Cotton was formerly Secretary, and is now Managing-Director, of the Alliance Gas Company; and his selection for the above-named position is a proof of the confidence reposed in him by his fellow-citizens.

ELECTRIC LIGHTING MEMORANDA.

Electric Tramway Accident in Liverpool—Nature of the Occurrence—Explanations and Excuses—Police Action—What is Needed.

It is a remarkable coincidence that the day which bore into circulation our comments upon the weakness of British tramway authorities in copying the demerits as well as the good points of American electric traction, should have been marked by the occurrence, in Liverpool, of the most serious trolley-wire accident that has yet happened in this country. The facts have by this time been made known far and wide; but it is expedient to repeat the story here, in order to get it upon record. There was a heavy fall of snow over the Northern Counties of England the beginning of last week; and at a particular place in Liverpool the snow lodged upon, and broke down, a cluster of telephone wires stretched, in the usual English fashion, over the house-tops. These wires fell across the trolley-wire in the street below, in the state of hopeless tangle natural in the circumstances. Of course, there was a "guard wire" over the live trolley wire; and equally of course it was quite inadequate to keep the heavy loops of telephone wires from making contact with the trolley wire. They effectively tapped the traction current, and conveyed it wherever they lay more or less concealed in snow. The result was that two wayfarers who became entangled in the fallen telephone wires were killed on the spot, as also were three horses; and more than a dozen persons were injured by burns and shock.

Nothing was spared that could heighten the terror caused by these fatalities. For the moment, the locality was struck with all the nameless horror associated with earthquake. Men did not know where to run, nor what to do to help themselves or others worse affected than themselves. Natural impulses, as that of endeavouring to pull men and horses away from wires seen to be burning into their flesh, could only be followed with the certainty of the would-be rescuers sharing the fate of the first sufferers. A carman was killed instantly upon touching a wire that had seemed to knock down his poor horse. Another saved his life by taking to his heels when he saw a wire cutting into his horse's back. So utterly demoralizing, as well as deadly, a catastrophe can scarcely have blackened the history of an English town. In cases of railway accidents or shipwreck, the survivors have at least a chance of proving their manhood, and lending a helping hand to their less fortunate fellows in distress; but trolley wires know none of this simplicity of tragedy, and their outbreaks are of a frightfully inhuman quality. Truly, as the newspapers frequently put it, man has by this means harnessed the lightning to his purposes; but at a terrible risk of what may happen should the imperfectly-restrained energy kick over the traces.

Of course, immediately after the accident the atmosphere grew thick with explanations and excuses, and official promises that nothing of the kind should ever be permitted again. It was convincingly stated in the newspapers that the Tramway Committee had boldly ordered every car to be equipped with a pair of india-rubber gloves; and what more could they do? Meanwhile, the attention of the local public was assiduously directed to the "vast accumulations of telephone wires" that had been going on of late years. It seemed to be hinted that here was the real cause of the mischief. By-and-by the telephone wires will be put out of the way underground; and then all will be well. That is as it should be; but meantime there is no avoiding the conclusion that, if the trolley wire had not been placed underneath the telephone wires, no "electrocution" could have taken place. It is instructive to note the remedial procedure actually followed in the occasion, in this highly-organized city of Liverpool. It was at 7 p.m., as the official police report states, when a police superintendent and sergeant, walking down the street, saw the fallen wires and people entangled in their coils suffering something worse than the mere mechanical restraint. The sergeant, like a man, ran to the rescue of a woman, and himself received a shock. Meanwhile, his superior hurried to the nearest police station and telephoned to the central police office.

An inspector, sergeant, and a strong body of constables were quickly on the spot, and kept the scene of the accident clear of people. But for this prompt action on their part, it is admitted that the loss of life would have been far greater. Wires were cut with a hatchet, at considerable risk to the users; and some of the sufferers were dragged away from the coils by the aid of loops of rope, handled by some exceptionally quick-witted constables. The tramway men were helpless. They had no insulated wire-cutters, gloves, nor any other appliance for dealing safely with a live wire; nor had they any idea as to how to meet the sudden emergency. While this was going on, foot messengers were despatched to the tramway offices (the telephone system being destroyed); and in due course the General Manager and the Traffic Superintendent arrived on the scene. "Inspector Foulkes informed Mr. Bellamy of what had occurred; and the electric current was at once shut off." In the same issue of the Liverpool newspaper from which this information is derived, it is stated that Alderman Petrie, the Chairman of the Tramways Committee, said the accident "shows the urgent necessity for all telephone wires being laid underground." He further stated that "the Electrical Engineer of the Corporation was at present preparing a report for the use of police constables and others as to the best means to be adopted in the case of accidents to electric wires in the streets." Thus the great policy of stable-door locking at the wrong time holds sway in Liverpool as elsewhere.

If the Liverpool Corporation or their electrical advisers fondly imagine that this perfunctory style of treating the matter will satisfy the public, they are preparing for themselves as disagreeable a shock as the people suffered in the streets of the city on the 4th inst. This is not a time for belated instructions to police constables—who, by the way, seem to know more about live wires than the tramway officials themselves—nor for handling the question with insulated gloves. Something will have to be done to assure the public that nothing of the kind shall ever occur again; that at least a live trolley wire to which anything dangerous happens shall become dead and harmless without all this running about after the tramway manager, or anybody else. This is the short point of the case; and the sooner it is settled, the better for the prospects of electric tramway traction everywhere.

THE WORLD'S COAL CONSUMPTION.

Part IV. of the Mines and Quarries Returns of the Home Office, for the year 1899, has now been published, and contains the statistics of the colonies and foreign countries so far as they are available. The figures relating to the number of persons employed are said to be somewhat unreliable in certain cases; but there is no reason to doubt the accuracy of the output figures. Nearly one-third of the world's coal supply in 1899 was furnished by the British Empire; the United States supplied nearly another third; and Germany more than one-sixth. The remainder was contributed mainly by Austria-Hungary, France, and Belgium.

For the first time in history, the United States outstripped us as a coal-producing country. Our increase in output, compared with 1898, was large—namely, 18 million metric tons; but that of the United States was far larger, being 30 million metric tons, or, roughly speaking, as much as the entire output of France. This enormous increase in the output of the States was rendered possible by the increased, and still increasing, use of coal-cutting machinery.

The difference between the two great coal-producing countries of the world in respect to the use of labour-saving appliances is very marked indeed. While the United States in 1899 obtained 23 per cent. of their total output of coal by the use of coal-cutting machinery, only a little more than 1½ per cent. was so mined in this country; the total amount of coal cut by machinery in 1899 being but 3½ million tons. It is to be hoped that the coalowners of this country will give their very serious attention to this question, and consider whether it be not possible to introduce machinery more generally into our mines. The advantages are obvious where the conditions permit of the use of machines; the reduction in the cost of production and the minimizing of the chances of labour troubles being desirable consummations in the interests of both owner and consumer. We are pleased to see that one of the leading organs of the coal trade is devoting considerable space to the discussion of coal-cutting machinery, with the expressed object of bringing its possibilities and advantages to the notice of the colliery proprietors. The greatest difficulty that lies in the way of a more general adoption of labour-saving appliances in this country is the opposition thereto of the men. It is, however, a question to be considered by the owners, whether they should not take joint action, if necessary, to overcome this opposition, which is as short-sighted as was that of the cotton operatives to the introduction of power looms.

The total output of coal in all countries in 1899 is estimated to have been 723,239,177 metric tons. The British Empire contributed 240 millions, including 5 million tons raised in India, 4⅗ millions in New South Wales, 4¼ millions in Canada, and 1 million tons in New Zealand. The United States raised 230¼ million tons, the German Empire 135⅘ millions, Austria-Hungary 38, France 31⅓, Belgium 22, and Russia 12¼ millions. The total increase in the world's coal production during 1899 was about 50 million tons.

WATER BILLS FOR 1901.

(*Continued from p.* 326.)

The Aldeburgh Corporation Bill is to enable the Corporation to acquire the undertaking of the Aldeburgh Water-Works Company, Limited, who obtained a Provisional Order in 1871. The capital of the Company is £1500, with a mortgage debt of £3000, of which £1200 was lent to the Company by the Corporation. The transfer is to be effected in consideration of a payment of £5000, from which the Corporation are to keep back the amount of their loan to the Company. Out of the balance, the Company are to pay off all other mortgages. The authorized works comprise a well and pumping station, with a rising main terminating at a water-tower situated on the Aldeburgh Park Estate of the Corporation. Additional water lands are to be acquired compulsorily within three years. The total amount of the Corporation water loan is not to exceed £20,000. Contributions to the sinking fund may be made out of the district fund.

The Aspatria, Silloth, and District Water Bill is to constitute and incorporate a Water Board for the urban districts of Aspatria and Holme Cultram, Cumberland, with power to supply numerous parishes in the county. Each District Council is to appoint four members of the Joint Board. The contemplated works include a

compensation reservoir, to be called the Overwater reservoir, at the north-east end of Overwater lake; an intake from the River Ellen; and another reservoir at Chapel House, on the same River Ellen. Compensation water is to be discharged down the Ellen at the rate of 440,000 gallons per day. The present owners of the Whitefield Estate, on the borders of the lake, are to be protected. The necessary lands must be compulsorily acquired within four years; and the works completed within seven years. The water obtained under the Bill is to be apportioned in stated proportions between Aspatria and Silloth. The charge for domestic supplies is to be at the rate of 4½ per cent. Metered supplies are to be charged at 1s. 6d. per 1000 gallons. No reduction is to be made by the Board for domestic supplies until the Board shall be out of debt to the contributing authorities for rates in aid. The sum of £35,000 is to be borrowed for water-works purposes, repayable in sixty years. Provisions are made for apportioning any loss on the undertaking between the contributing authorities. A schedule prescribes the procedure of the Joint Board.

The Barrow-in-Furness Corporation Bill contains a part dealing with water. This relates to the construction of additional water-works, comprising a reservoir, to be called Seathwaite Tarn Reservoir, to be formed by impounding the Tarn Beck. There is also to be a weir or overfall across the River Duddon. The compensation water discharged down the Duddon is to be not less than 3 million gallons per day; but the total quantity of water which the Corporation may intercept is to depend upon the flow of the river. The additional works are to be completed within ten years. Lands are to be held and bye-laws made for the protection of the drainage area. The sum of £175,000 is required for water-works purposes.

The Broadstairs and St. Peter's Water and Improvement Bill contains a part relating to water. The district is now supplied by a Company incorporated in 1875, who have a mortgage debt of £4500. The undertaking is to be transferred under the terms of a scheduled agreement, which stipulates for the payment on the appointed day of the sums of £42,300 and £500, the latter as compensation to the Directors. The loans of the Company are to be taken over. The additional works proposed include two adits commencing at the existing well and pumping station of the Company at Rumfields, to be completed within five years. The rate for domestic supplies is not to exceed 6¼ per cent. of the gross estimated rental. Metered supplies are to be charged for at the price of 1s. 6d. per 1000 gallons. The sum of £50,000 is to be borrowed for the purchase of the undertaking, and £12,000 for the extension works, repayable in fifty and sixty years.

The Derby Corporation Bill contains a part relating to water-works. It is proposed to construct additional works, including filter tunnels in the parish of Allestree, and connections with existing works. The Midland Railway Company are protected. Bye-laws are to be made for the prevention of pollution of the source of supply. The new works are to be completed within fifteen years. The sum of £50,962 is to be borrowed for water-works purposes.

The Derwent Valley Water Board Bill is to confer further powers on the Derwent Valley Water Board, who were constituted by an Act of 1899. The Board desire to abandon the construction of the authorized Derwent reservoir and certain subsidiary works, subject to payment of compensation. Additional lands are to be acquired, and a new Derwent reservoir made in the parishes of Hope Woodlands, Derwent, and Bradfield. This entails a number of subsidiary works. The sum of £400,000 is to be raised for the purpose. Instead of borrowing money on mortgage, the Board desire power to issue bills of not less than three nor more than twelve months, and of value not under £1000. Permission is desired to arrange with a bank for this system of financing the Board. Not more than £500,000 is to be current in bills at one time; but bills are to be renewable at maturity. Agreements may be made between the Board and the Corporation of Sheffield for the prevention of plumbism. The Board desire permission to make applications to Parliament.

The Harrogate Water Bill is to enable the Corporation to make a new reservoir, to be called the Roundhill reservoir, on a tributary of the River Burn called Pott Beck, with the necessary subsidiary works. During the construction of the works, the Corporation desire to take the waters of the Pott Beck, provided that there shall be at least a million gallons per day left flowing. Where tunnels are to be made at a depth of 15 feet below the surface, the easement only need be paid for. The new lands are to be acquired within five years, and the works constructed within ten years. Lands may be held for the protection of the drainage area. The sum of £325,000 is to be borrowed for the purchase of lands and the construction of works, and a further sum for paying interest on the cost of construction during the first ten years.

The Hartlepools Gas and Water Transfer Bill deals in part with the acquisition of the water undertaking of the Hartlepool Gas and Water Company by the Corporations of Hartlepool and West Hartlepool, acting by means of a Joint Committee. The price to be paid for the property is to be ascertained by arbitration. The Manager and the Secretary of the Company are to be compensated for any loss of emolument; and the Arbitrator is to state the separate value of the water undertaking.

The Heywood and Middleton Water Board Bill is to empower the Board to construct additional water-works, including reservoir enlargements and new catchwater drains. Special provisions are made for dealing with aqueduct easements. Compensation water is to be discharged down the Cheesdon Brook after the rate of 530,000 gallons per working day of ten hours, commencing at six o'clock in the morning. The new works are to be completed within ten years. The proposed division of the Ashworth Road is to be maintained by the Board for twelve months. The time specified in the Heywood Acts of 1877 and 1889 and 1898 for the completion of certain works is to be extended to ten years from the passing of this Bill. The area of supply by the Corporation is defined. For the purchase of lands and the construction of the proposed works, the sum of £110,000 is to be borrowed; and £65,000 for completing the Nayden reservoir. The Heywood Corporation are to transfer their water-works sinking fund to the Board. A schedule contains the sections of the local Water Acts saved from repeal.

The Ilkeston and Heanor Water Board Bill is to constitute and incorporate a Joint Board representative of the Corporation of Ilkeston and the Heanor Urban District Council, with power to acquire the undertaking of the Meerbrook Sough Company. This Company was formed and incorporated in 1842 for the purpose of draining certain lead lands in the parish of Wirksworth, Derbyshire, of water by means of a level or water-gate called the Meerbrook Sough. It is now desired to appropriate this undertaking, and make it part of water-works for the supply of the Ilkeston and Heanor districts. The transfer is to be under the conditions stated in a scheduled agreement, the price being £5000. Some of the Company's statutory rights are to be reserved to the Joint Board. Additional works are to be constructed, to be completed within seven years. The water is to be apportioned between the constituent authorities on the basis of population. The sums of £6000 and £106,500 are required for the purchase of the Company's property and for general water-works purposes. The rate for domestic supply of premises exceeding £20 annual value is 6 per cent.

The Kettering Urban District Water Bill is to empower the Council to construct additional water-works for obtaining a supplemental supply of water from the Slade and Thorpe streams. A reservoir is to be made by means of an embankment across the valley of the Slade, in the parishes of Rothwell and Orton, and another one (the Malsor reservoir), in the parishes of Rothwell, Orton, and Thorpe Malsor. The necessary lands are to be acquired within five years, and the works completed in seven years. Compensation water is to be provided in both cases. Measures are to be taken for the prevention of pollution of the source. Service pipes are to be inspected. The sums of £126,000 and £10,000 are required for the proposed and general works of the undertaking. The money may be raised by the issue of debentures or annuity certificates, or by mortgages. The commencement of the sinking fund is to be deferred five years.

The Kingston-upon-Hull Corporation Bill proposes, among other things, to alter the name of the City to the popular and simple form of "Hull." Lands in the parish of Cottingham are to be held for the protection of the water supply, and bye-laws made for the same object. Metered supplies are to be charged 2s. per 1000 gallons. The sum of £33,000 is required for water-works purposes, which may be raised by the issue of redeemable Corporation stock. Corporation bills may also be issued, in units of £100; but otherwise on terms similar to those proposed in the Derwent Valley Board case.

The Llandrindod Wells Water Bill is to authorize the District Council to purchase the undertaking of the Water Company, whose Bill has already been noticed. Power was conferred on the Builth Rural Sanitary Authority in 1884 to purchase the undertaking upon terms; and similar powers were conferred in 1893 upon the Llandrindod Wells Local Board. The District Council claim to be the successors of these Local Authorities, and desire to exercise the purchasing powers under new conditions. The transfer is to be for a price to be ascertained by arbitration under the Lands Clauses Acts. Unauthorized works and stocks-in-hand are to be sold separately. The mortgage debt is to be paid off by the Company before the transfer. The specified works include a reservoir on the Careg-Wiber bank, and a covered service reservoir at Broomy Hill. The Council propose to take the waters of the Howey Brook, a tributary of the Ithon and Wye Rivers. The works are to be completed within ten years. The rate for domestic supplies is to be 6 per cent., with 7½ per cent. for hotels: metered supplies to be charged 2s. 3d. per 1000 gallons. Besides the amount of the purchase money, the sums of £10,800 are required for the purchase of lands and the construction of the authorized works, and £4000 for the future extension and improvement of the water-works. The loans are to be repayable in sixty years.

The Prestatyn Water Bill is to authorize the Urban District Council to purchase the undertaking of the Dyserth Meliden and Prestatyn Water Company, whose capital amounts to £5000, with no mortgage debt. The transfer is to be by arbitration. Additional works are proposed, to be situated wholly in Flintshire, chiefly for the collection of the waters of a spring known as Ffynnon Asaph in the parish of Cwm. A hydraulic ram is to be used in the parish of Dyserth. The new works are to be completed within ten years. A hydraulic ram at Marian Mill in the parish of Cwm is to be acquired. Rates for domestic supplies are to be 8 and 7 per cent. Metered supplies are to be charged 2s. 3d. per 1000 gallons. The sums of £5000 and £4000 are required for the purchase of lands and the extension of works, repayable in sixty years.

The Southport Water-Works (Transfer) Bill is to constitute and

incorporate a Joint Water Board, consisting of representatives from the Councils of the Borough of Southport, the Urban District of Birkdale, and the Rural District of West Lancashire, and to transfer to and vest in such Board the undertaking of the Southport Water-Works Company. The limits of supply are defined. The price of the undertaking is to be settled by arbitration, and is to include an allowance for costs of winding-up and distributing the assets of the Company. Officers of the Company (not Directors, nor ordinary workmen) are to be compensated for any loss of emolument. The mortgage debt of the Company is to be a first charge on the property transferred. Power is sought to supply adjoining districts. An agreement between the Corporation and the Rural Council is to be confirmed. The principal water loan is to be repayable in sixty years. Surplus profits are to be applied in reduction of the water rents and charges—not to the district funds.

The Stratton and Bude Improvement Bill contains a part relating to water supply. It contemplates the supply of the district from the existing Bude and Holsworthy Canal; the works to be completed within five years. The rate for domestic supplies is to be 10 per cent. on rateable value; and the price of metered supplies is to be 2s. per 1000 gallons. Free public drinking fountains are to be authorized. The sums of £16,700 and £5000 are required for water-works extensions and improvements.

The Wells Corporation Water Bill is to authorize the Corporation to purchase the undertaking of the Wells Water Company, Limited, by arbitration under the Lands Clauses Act. The officers of the Company are to be compensated. The additional works to be authorized include a storage reservoir to be formed by impounding Holes Ash or Kirkham Coombe, and connected with the existing service reservoirs of the Company. These works are to be completed within five years. Lands may be acquired and held for the protection of the drainage area. The rate for domestic supplies is to be 5 per cent., with extras for horses, cattle, and carriages. Metered supplies are to be charged at the rate of 2s. per 1000 gallons. The sum of £10,000 is required for water-works improvements, repayable in sixty years.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 420.)

Business on the Stock Exchange last week was only moderate on the whole, except in one or two special lines (such as the American market) where there was a good bit of animation. The tone generally was fairly firm, though not altogether free from fluctuations; and prices for the most part showed a marked advance. A conspicuous exception was apparent in the Funds, which gave way in view of the further demand of the Government for the sinews of war, which has taken the form of eleven millions of Exchequer Bonds. In the Money Market rates came down with a run from the very opening, and a reduction of the Bank rate was soon regarded as a certainty. It came on Thursday, when the 5 per cent. rate fixed five weeks ago was changed to 4½ per cent.; but thenceforward there was no further ease, but rather a slight tendency to harden. In the Gas Market, business was on the whole no better than moderate. Some days it would be fairly brisk, and on others it would fall very quiet. The tendency as a rule was steady, and changes of quotation were nearly all in the upward direction; but they were not very numerous, and not very large. In Gaslight issues, the ordinary opened operations on Tuesday with a great flourish, and touched ½ premium, and did the same next day. But it could not be maintained, and the figures dropped gradually down until 98½ was the closing mark. The secured issues were quiet and firm, the debenture stock recovering a point. South Metropolitan was only moderately dealt in, but at good steady figures; and the announcement of the reduced dividend at the rate of 5 per cent. did not seem to affect prices. A few transactions in Commercials were marked at good figures. In the Suburban and Provincial group, business was on the quietest scale, and there were no changes in quotation. The announcement of the Crystal Palace dividend at the reduced rate of 5 per cent. produced no alteration. Among the Continental Companies, the general characteristic was quiet business and steady prices. European and Tuscan had advances. Among the more remote undertakings, Melbourne bonds and Cape Town advanced, and Oriental new recovered; but River Plate bonds were lower. Business in the Water Companies was only moderate, and the general tendency was decidedly weaker, possibly in view of the fresh parliamentary campaign which will be forced on them this session.

The daily operations were: Gas was very quiet on the opening day; and the only move was a fall of 1 in River Plate debenture. Lambeth Water receded 2. Tuesday's operations were brisker. Gaslight ordinary advanced 1, and Cape Town ½. Business relapsed on Wednesday; and changes were limited to a rise of ¼ in Tuscan. In Water, the debentures of Lambeth and West Middlesex fell 1, and of Grand Junction 5. Business recovered some activity on Thursday. Melbourne bonds and Gaslight debenture rose 1 each; but Gaslight ordinary fell 1. In Water, East London receded 3, and Chelsea 1. Transactions on Friday were more restricted. European, fully paid, rose ½, and Oriental new ¼. Saturday was about as usual, and Gas quotations did not move. In Water, New River rose 2; but Chelsea fell 5.

A GUIDE TO THE COMPANIES ACTS.

The passing of the Companies Act, 1900, has had the effect of throwing out of date all text-books on the law governing the creation and management of joint-stock companies formed under the various Companies Acts. Messrs. T. Gore-Browne and W. Jordan have accordingly issued a new and entirely revised edition of their well-known "Handy Book on Joint Stock Companies" (Jordan and Sons, Limited), containing the provisions of the new Act, with full explanatory comments thereon, together with the decisions of the Courts last year on points arising under the Acts. The handbook (of which this is the 23rd edition) now cites nearly a thousand decided cases—a fact that may be commended to the consideration of those who rush into print every time a couple of cases under the Workmen's Compensation Act come before the Courts. No Act ever was, or ever will be, drawn in which lawyers can find no ground for debate; and the only fair standard by which to judge any statute, as a source of litigation, is the proportion borne by the cases carried into Court to those arising out of the provisions of the measure.

So far as the Companies Act of 1900 is concerned, the authors of the handbook anticipate that "there will probably be much litigation" before its exact bearings can be discovered. They say: "Upon the whole, the changes in the law appear to be beneficial. But the wording of the Act is in many cases very ambiguous; and in commenting upon it, it has been necessary to use great caution, and often to take refuge behind such words as 'it is presumed,' or 'it appears' that so and so is the case."

The most important case decided in the Courts since the previous edition of this book was published, was that of "The National Bank of Wales," dealing with the duties and responsibilities of directors, and commented upon in the "Journal" in September, 1899. As an appeal has now been heard by the House of Lords, and judgment may be expected at any time, no mention of the points decided by the Lower Court need be here made.

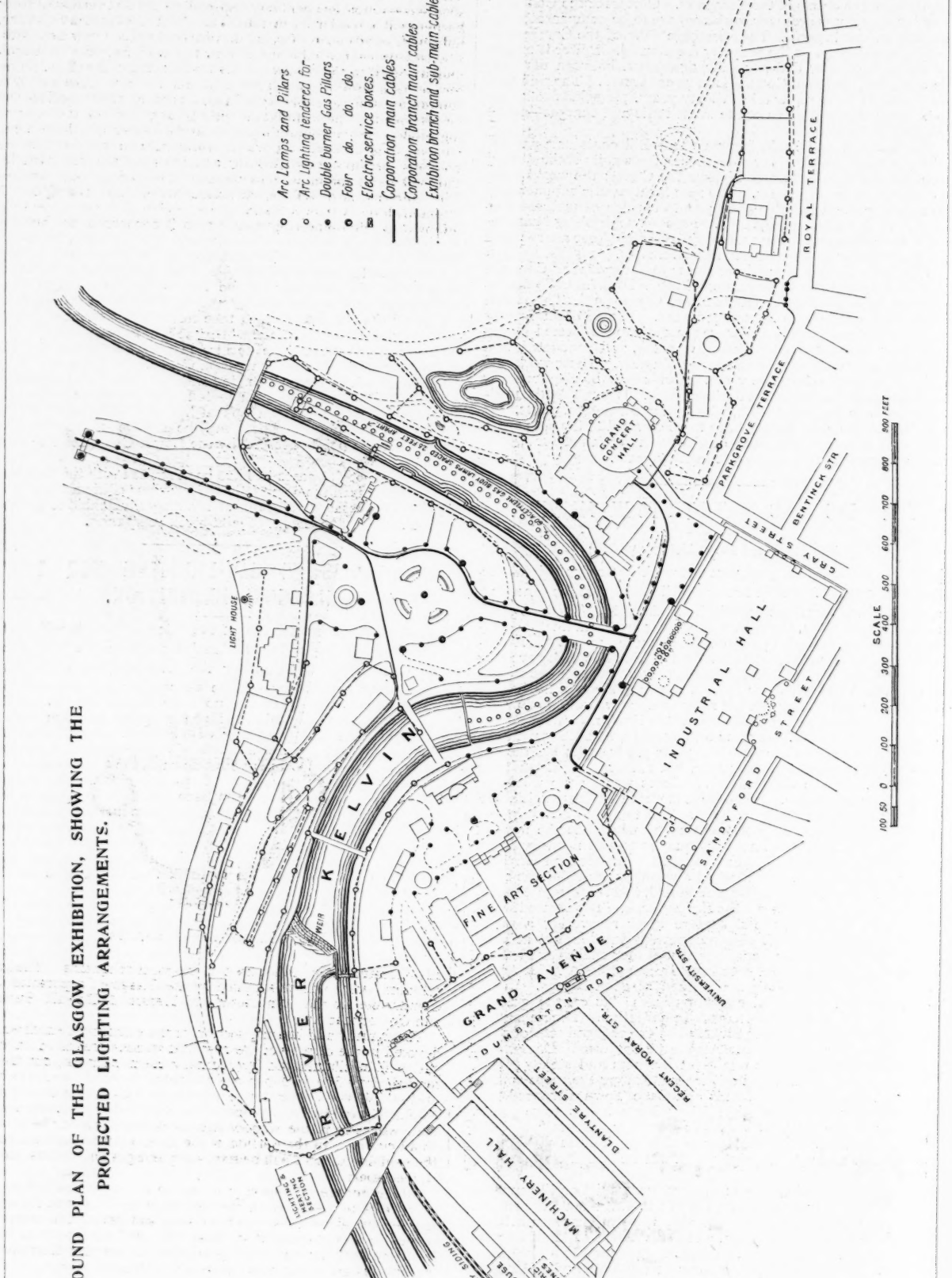
The handbook appears to have been revised with the care that has characterized the compilation of previous editions; and it is almost unnecessary to add that it is simply invaluable to all concerned in the management of joint-stock companies.

HIGH-PRESSURE GAS-LIGHTING FOR THE GLASGOW EXHIBITION.

Considering the magnitude of the interests which will claim space in the Glasgow International Exhibition, we have good grounds for believing that, by the time the day of opening arrives, the gas industry will be thoroughly satisfied with its representation; and for this, in no small degree, thanks will be due to the energetic devotion to its cause of Mr. William Foulis, the Corporation Gas Engineer of Glasgow. Ever since Mr. Foulis saw the magnificent example of high-pressure gas-lighting which the Paris Gas Company put down in the Champ de Mars and elsewhere in the Paris Exhibition, and which was the delight of all gas men who saw it, he has been solicitous to obtain in the Glasgow Exhibition, if not such an extensive installation, one of which the home gas industry would not be ashamed, and which would bear a highly luminous testimony to the powerful accomplishment of gas engineers in this branch of the business. The information to hand leads us to think that Mr. Foulis will be found to have gained his end.

As most readers are probably aware by this time, the site of the exhibition is Kelvingrove Park; and it will embrace an area of 67 acres, through which runs the River Kelvin. The site is the same as was occupied by the exhibition of 1888, which, it is recorded, was visited by some 6 millions of people. Glasgow is making a brave effort to exceed what they then did; and subsequent progress in the Sciences, Arts, and Manufactures should enable them to attain a brilliant result. The exhibition is expected to run from May to November. In the hope that it may generate more than a passing interest in the matter in the gas profession, we give an illustration of the exhibition buildings and grounds as it is expected they will appear, although it must be confessed that we cannot altogether imagine the conversion of the site into quite such a picturesque piece of scenery as is here depicted. We also publish a plan of the buildings and grounds, which may be found useful to visitors hereafter, and which serves the immediate purpose of conveying to readers a better idea of the extent of the projected high-pressure gas lighting than we could convey by any other means of description.

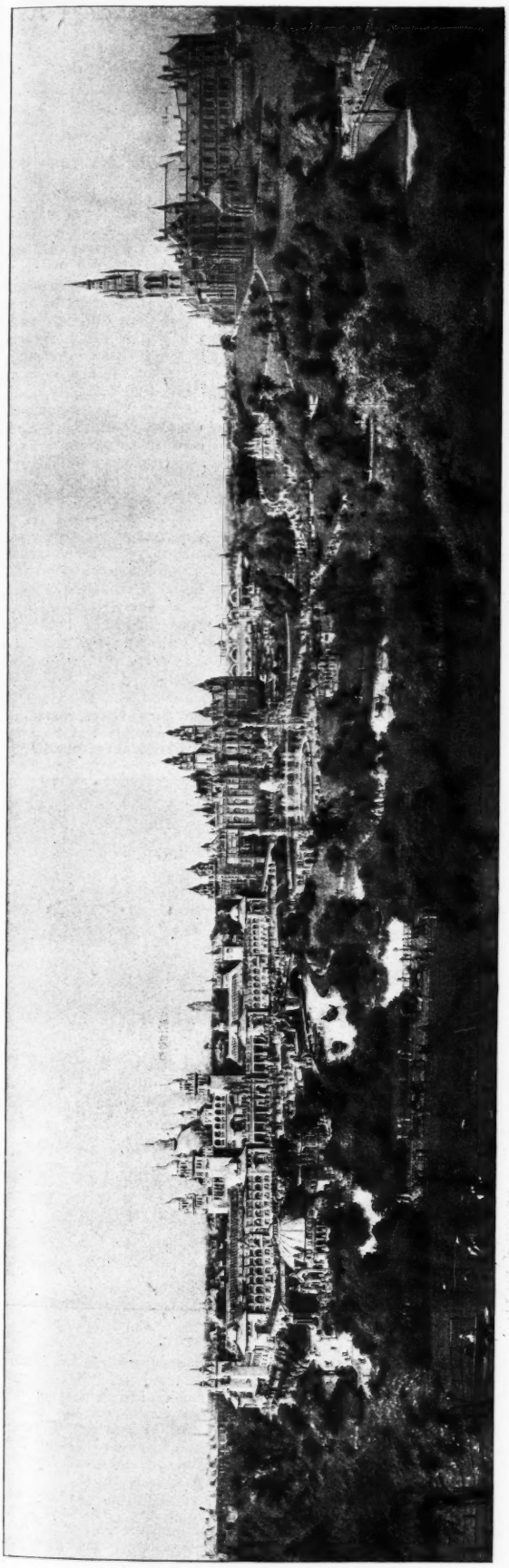
Of course the difference in the expanse of the Paris and Glasgow Exhibitions will not permit of the demonstration of high-pressure gas lighting on the scale that obtained at the former; but in proportion we look for equal, and even entertain a hope for improved, results in the forthcoming display. The Welsbach Company have secured the honour of carrying out the work; and they are bent on justifying the confidence reposed in them. A conversation on the subject with the Manager of the Company's public lighting department (Mr. Kenneth H. Buchanan) has convinced us that he will not leave a stone unturned to achieve success. Already he has the minutest detail within his grasp, and is exercising every care to ensure that there is no flaw in the plans for bringing the



GROUND PLAN OF THE GLASGOW EXHIBITION, SHOWING THE PROJECTED LIGHTING ARRANGEMENTS.

high brilliance of this system of lighting to the public view. He is quite alive to what defective lighting would mean for the industry at large under such circumstances.

So far, this will be the greatest exhibition of high-pressure gas



The Glasgow Exhibition Buildings and Ground, and the University (on the right) where the Engineering Congress will be held.

lighting we have had in the United Kingdom. It will embrace the main avenues in the grounds and the entire front of the exhibition buildings. The central avenue which will be lighted is ¼ mile in length; a circle of some 100 yards adjoining will also be illuminated; and the line of the buildings along which the lighting will be carried extends to ½ mile or thereabouts. The location of the high-pressure lamps is indicated on the plan by black spots, the larger of which represents lamps of greater power than the smaller ones. The Corporation Gas Committee are laying down high-pressure mains, and will supply the gas free. The pressure will be generated by a duplicate set of Keith's compressors, each capable of passing from 5000 to 6000 cubic feet per hour. Specially adapted Welsbach-Kern burners will be used in the installation. From these burners, we are informed, an efficiency of 35 candles per foot of gas is obtained, with a consumption of 10 cubic feet at 8 inches pressure, which is a prominent result in the records of high-power gas lighting. Therefore in each lantern containing a cluster of three burners, consuming together 30 cubic feet of gas, a light of 1000 candles will be produced. The installation will comprise 120 columns carrying single lanterns containing 1000-candle power (or three-light) clusters, nine columns carrying five three-light lanterns, and eleven columns carrying three three-light lanterns. The entire installation will give a minimum illuminating power of 210,000 candles. The lanterns used will be the type known as the Welsbach "Shadowless." It is a 22-inch one, and it has been specially adapted for high-power lighting. It is illustrated here; but the

The "Shadowless" Lantern.

anti-vibrator shown is not used in this form of lighting. The lamp columns, which will be supplied by the Glasgow Corporation Gas Committee, are the manufacture of Messrs. M'Dowall, Stevens, and Co., of that city.

The lighting and heating section of the exhibition, which will be devoted to the display of the best and various means of utilizing gas, will be illuminated by ordinary Kern burners; but the interiors of the fine and spacious buildings in which the great bulk of the exhibits of other industries will be housed, will be given up completely to electric lighting. The part which the same illuminant will take in the outdoor lighting is indicated on the plan by small circles. In the portion of the River Kelvin running through the exhibition, there will be sixty acetylene gas buoy lamps, spaced 25 feet apart.

Altogether the exhibition promises to contain much that will be of interest to members of the gas profession; and, so far as the gas section alone goes, we have seen sufficiently far behind the scenes to feel assured that those who will have a voice in its furnishing will not fail to bring together a collection of appliances worthy of a great and ever-increasing industry.

[Attention may be called here to the statement made by the President of the Institution of Gas Engineers, Mr. James W. Helps, at the meeting last Saturday, with reference to the project for holding an Engineering Congress in Glasgow in September—one section of which is to be devoted to gas engineering. The report appears on p. 397.]

COMMUNICATED ARTICLES.

BUSINESS SKETCHES IN AMERICA.

SOME METHODS WORTH EMULATING.

By E. W. T. Richmond.

"I rather would entreat thy company,
To see the wonders of the world abroad."
"Two Gentlemen of Verona," Act I., Sc. 1.

The Lesson of Dayton.

Quitting Cleveland, I came to Dayton, and there I had one of the most fascinating experiences of the whole of my journey—an experience which comes well within the scope of the "Journal," and which I feel confident will appeal to, and possess interest for, all employers of labour. With the one remark that the manufactured gas of Dayton is of an illuminating power of 21 candles, and is distributed at 85 c. per 1000 cubic feet, I will at once turn to the marvellous organization I saw there.

I have always held, and my visit to Dayton has considerably strengthened my view, that a wise solicitude for one's employees is about the best fertilizer that one can have for a business enterprise. But a higher motive than that should influence the regard which an employer should possess for the well-being of those over whom destiny has placed him. It is a duty that such regard should be exercised—it is a duty imposed by the governing position in which the employer is placed; and there should be no avoidable breach or failure in the performance of that duty. I have no sympathy with those who, to escape from their trust, or to endeavour to screen from the eyes of their fellows their indifference to it or its violation, say "a commercial undertaking is not a philanthropic society." The people whom we employ are of our flesh and blood, and they are swayed by the same feelings and emotions; and anything that an employer can prudently do for them to lighten their lives ought to be done, aye and must be done if his natural and moral obligations are rightly considered. In our small way we have endeavoured, in the business with which my name is associated, to do something to bring comfort and pleasure to those employed; and it has brought its reward. But what we have done is small compared with many companies and firms in the country—notably the South Metropolitan Gas Company, Messrs. Cadbury, and Messrs. Lever Brothers.

Dayton Methods of Making Workpeople Comfortable.

But I have been digressing, and must return to Dayton, where is situated the National Cash Register Company's factory, and it is, without any perversion of the truth, appropriately styled "the Model Factory of the World." Visitors are always welcome, and those who endeavour to do something for their employees over and above the question of mere wages, are doubly welcome. So much so, that on the occasion of my visit, on Nov. 17 last, I was heartily welcomed to luncheon with the staff, and for the first time in my life (and possibly for the last) flags were hoisted in my honour. Even this little act affords interest to the workpeople, who are informed as to who their visitor is by the issue of a printed bulletin, which in my case, was as follows:—

> **NOTICE.**
>
> **The flags are up to-day in honor of Mr. E. W. T. Richmond, of Richmond & Co., Ltd., Warrington and London, England.**
>
> Bulletin No. 300. November 17, 1900.

The visit to this factory proved, I can truthfully say, one of the greatest object-lessons of my life; and if I had seen nothing else in the States, I should not have counted my trip to America a loss. The works are immense; the floor-space alone being equivalent to 13¼ acres. The capital is 5 million dollars; and the employees number 2400, to which figure it has grown since 1884, when there were only 14 hands. It is, however, of the employees, and what is done for them, that I chiefly wish to write. The present system of management was adopted by the Company in 1894; and the features which make it prominent, and which do so much in "character-building" have been developed during the six years which have elapsed. The pay-roll, some six months since (and it is a constantly increasing quantity) amounted to $27,000 per week, or about 1½ million dollars per year. The Company's earnest advocacy of the principle that employers owe something more than wages to their employees has produced, it is safe to say, an unrivalled organization of business methods, of which the following are some of the distinctive features:—

Supervision.—The direction of the business, under the President, Vice-President, and General Manager, is by a system of Committees, including Office, Factory (which takes the place of a superintendent), Cabinet, &c. Individual responsibility is insisted upon, and every man encouraged to present his own ideas; and, so far as can be, he is permitted to work them out.

Two Views in this Hive of Industry.

Consultation.—Meetings of officers, foremen, and assistants are frequently held for consultation upon the best methods of conducting the general business, and the details of the various divisions. So successful is this idea, that the operation of the many departments has become largely automatic. The result is that the highest officers are relieved of details, and are thus given opportunity for the study of business extension, and the best forms of manufacturing. At the same time, the good will and full effort of all the employees have been obtained. Other features of the system relate to the economical and easy tracing of stock in the factory by colour systems, use of monitor-boards instead of unwieldy records, definite relations of departments and plants for communication among them.

Suggestions.—To encourage thoughtfulness on the part of all employees, prizes amounting to $690 are awarded every six months to the

fifty persons making the best suggestions regarding the conduct of the business or improvement in the manufacture of the product. These suggestions number from 2000 to 3000 a year, a large proportion of which are of sufficient value to be adopted for use in the business. The distribution of these prizes is made a gala occasion for the entire factory and office force. In addition to the prizes to people in the office and factory, monthly prizes are offered to the Company's salesmen who show the best net results in their business.

FACTORY COMMITTEE.

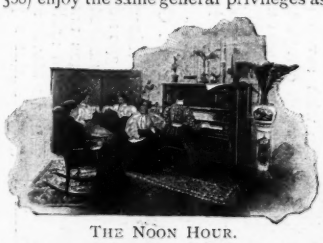
In order to encourage a proper *esprit de corps*, regular grading of departments is followed. The departments in office and factory that have the best record each month receive the banner for the succeeding month; and those showing the most successful work for the year are rewarded by a day's vacation, with a trip to some large city, and all expenses paid.

Comfort for All.—Free shower-baths are provided; and all are allowed twenty minutes of the Company's time each week for bathing. The men receive ten hours' pay for nine-and-a-half hours' work; and the women ten hours' pay for eight hours' work. Absolute cleanliness prevails; a force of janitors being constantly occupied in keeping windows, floors, and machinery perfectly clean. Large windows admit abundance of light; and by a careful system of ventilation, the air is kept pure. Bicycle storage racks and compressed air for the inflation of tyres are conveniences provided for all. A fire-brigade, regularly drilled, and hose-stations distributed in many places throughout the buildings, ensure protection against fire. An evening lunch is provided for those compelled by any cause to work overtime.

EXECUTIVE COMMITTEE.

Education.—A carefully selected library of 600 volumes and 50 periodicals is at the command of all employees. A reading-room is provided; and for their convenience books are brought directly to them in the factory by means of a travelling library. Flowers and palms are tastefully distributed in the various departments. Ample lawns, beautifully laid out with masses of shrubbery and blooming plants, surround the buildings. Frequent entertainments are planned for the benefit of employees, in which the ablest speakers of the country participate.

Young Women's Advantages.—The young women (of whom there are 300) enjoy the same general privileges as the men. Baths, toilet-rooms, and clean white aprons are furnished them by the Company. Ten minutes' recess is given morning and afternoon; and many other thoughtful arrangements have been made for their convenience and comfort. Among other things, they start work an hour after the men, and leave ten minutes before them. Cooking, sewing, and the household arts are taught to all who desire it (in a building especially provided), by a competent instructor, paid by the Company. An attractive dining-room is located in the factory building, where warm lunch is served the women at the noon hour, each day, at the nominal charge of 1 c. (½d.) per day.



THE NOON HOUR.

Now what response do the employees give to all this kindness and thoughtfulness. The encouragement received leads the men and women to plan for their own improvement. Thirty or more clubs, societies, and schools are now in operation in the factory and neighbourhood. These are encouraged by the Company; but most of them are organized and managed by the people themselves. The influence on the neighbourhood—moral, mental, and social—is great; and beautiful homes and surroundings, and intellectual men and women, are the results. The fine intelligence and conscientiousness thus developed in the employees is brought to bear upon their work; and the advantages have a triple bearing. Skill and contentment are engendered, and cannot fail to be cultivated on the part of the workpeople; the Company benefit by their employees' skill, loyalty, and permanence of service; and the resulting constantly decreasing cost of production, and excellence of work, are the gains of the customer. Having been, having seen, and having inquired into these things, I can bear witness to the truth of them; and who can therefore wonder that I return to England with deeper convictions as to the wisdom of a prudent consideration in these directions on the part of an employer for those he employs, and for which consideration he will be amply recompensed by improved skill, fealty, watchfulness, and care? The experience of Dayton and other enlightened concerns encourages one to quote these lines from "Richard III.":

> "All for our vantage. Then, in God's name, march.
> True hope is swift, and flies with swallow's wings,
> Kings it makes gods, and meaner creatures kings."
>
> Act V., Sc. 2.

It was with a touch of regret, and certainly with a greatly enlightened and well-occupied mind, that I left this "spotless town" of Ohio for Cincinnati, which was the exact antithesis of Dayton in point of cleanliness.

CINCINNATI AND GAS RAIDERS.

If Cincinnati does not strike one as being what we should call spick-and-span in its general appearance, the heartiness of its people is a full compensation. General Hickenlooper, the President of the Gas Company, is a veteran gas manager; and by him I was most cordially received, introduced to the Vice-President of the Company, and given quite a fund of information as to how the Company's business has been successfully cultivated.

Before going into details on that head, however, an aspect of American gas affairs (which is at once interesting to the outsider, but decidedly annoying to the invaded) may be alluded to. The Cincinnati Company have been threatened with severe competition by a number of capitalists, who are known in New York as professional gas raiders, and who do not confine their unacceptable attentions to that city. There are quite a number of these unworthy gentry about the States; and their mode of operation is this: They select a town where competition is thought likely to pay, and make a desperate raid on it. Public meetings are held, and good speakers are engaged to point out to the public the enormities that the existing Company have been guilty of, and what advantage would accrue to the town if a new Company were started. This is followed up by articles in the Press, and public feeling is whipped up to such an extent that the Municipality frequently have to bow to the storm raised, and grant a franchise to the invaders to open up the streets for the laying of the mains. In some cases, they are bought off before they commence operations; but more frequently a quantity of capital is sunk by the new company, and the prices of the old company are brought down until both concerns lose heavily; and then it is a question as to which will stand the loss longest. The deepest purse wins. The victorious company then buy the other company out; and the gas consumer has to pay the capitalization of both concerns. Immediately after the amalgamation, the price of gas is put up to such a figure as will pay the dividend on the inflated capital of both undertakings, the capital spent on one of which is, to a large degree, wasted. This is a deplorable state of affairs; but there it is, and it cannot be prevented under present circumstances.

General Hickenlooper has, however, by experience learnt the best and readiest methods of disposing of the raiding gentry. He was successful only just recently in staving off a threatened competition by securing the good offices of the Municipality, by making considerable reductions in the price of gas and by other means. In 1872, the Company charged $2·75, or 11s. per 1000 cubic feet, for their gas. When the raid took place, the price was a dollar. Now it is down to 75 c., or 3s. per 1000 cubic feet, and is in the course of ten years to be reduced, by equal annual reductions, to 2s. per 1000 cubic feet, or 50 c. Cincinnati is practically the only large town which has avoided the erection of duplicate works, and the actual starting of a fresh company. To escape the possibility of having to face further competition at the end of ten years, the Company will naturally keep the price of gas down as low as possible.

INCREASING STOVE OUTPUT BY SOCIETY CANVASSING AND OTHER METHODS.

With regard to the steps taken to develop the business, the Cincinnati Gas Company, eight or ten years ago, commenced canvassing for stoves, and did it in a thoroughly American fashion. A lady was engaged, and she had a brougham and coachman and footman in livery. With her smartly appointed equipage, she called on the residents, and explained the advantages of cooking by gas—first securing the patronage of some of the leading inhabitants, so that it becomes the fashion to use a gas-stove, and a very large proportion of the people straightway ordered stoves. The Company followed this up by continuous canvassing, and also opened a show-room, with excellent results. The people who had stoves were not left to their own devices in regard to using them; but they were taught how to secure the best results out of them. The Company found that pamphlets and circulars were of very little good; but they obtained testimonials from between 3000 and 4000 people, and published them in book form. In these various ways, they have placed 20,000 cookers among 25,000 consumers, which is a proportion and record of which any English Company would be proud.

PUBLIC LIGHTING.

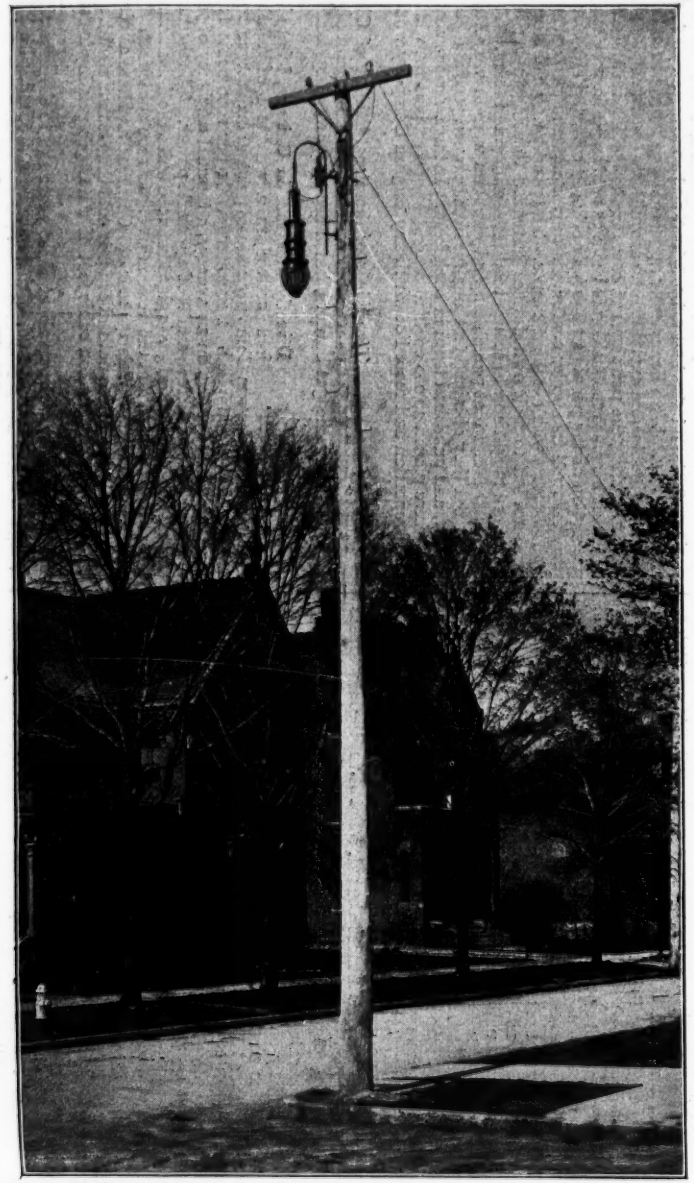
Two-thirds of the street lighting of Cincinnati is by electric arc lamps, and one-third by flat-flame gas-burners, which are now being supplanted by incandescents.

CHICAGO GAS.

Directly I set foot in Chicago, I found I had arrived in a whirlpool of a city. Here again, under one Company, natural gas and ordinary manufactured gas are supplied. For water gas $1 per 1000 cubic feet is charged; and it has, on an average, a thermal efficiency of 700 units per 1000 cubic feet, and is of 24-candle power. The thermal efficiency of the natural gas is placed at 1000 units, the illuminating power at 8 candles, and the price is 50 c. per 1000 cubic feet.

The natural gas travels 150 miles to Chicago; and here as elsewhere more gas of the natural order is sold than is manufactured, although about 23 million cubic feet of water gas per day is said to be distributed.

The Company woke up about three years ago to the necessity of pushing gas-stoves; and, having once been aroused, with true American audacity they determined to excel all previous efforts



DETROIT LIGHTING—A PRIMITIVE METHOD OF SUSPENSION.

by any other gas company—American or otherwise. In the first year 20,000 cookers were sent out, in the second year 27,000, and in the third year 20,000—*i.e.*, 67,000 in three years. These are in use by ordinary consumers, not few of the latter class. This is one of the few concerns in the States that hire out stoves. They have 300,000 meters in use; so that, notwithstanding their remarkable performance in the stove business, the Company have yet a big field to till. They are still pegging away, having 20 to 30 canvassers at work, with average salaries of £2 to £3 per week, besides which they pay the stove dealers 4s. to 7s. for every stove they place. The Company advertise largely both in tramcars, on their own waggons, by means of the wide distribution of pamphlets, on their gas bills, and in newspapers.

A RECORD OUTPUT OF STOVES.

prepayment; there being very

THE CHIEF OFFICER AT CHICAGO.

Mr. O. D. Knapp, the General Manager and Chief Engineer of the Chicago Gas Company, stands on the very top rung of the ladder of the American gas profession; and I was disappointed at missing him in Chicago. Indeed, his position in America is such that I possibly may be forgiven for saying that, if he approved of any innovation in the gas business, it would be considered safe to go "K"nap on it.

PUBLIC LIGHTING.

As to the public streets the suburbs of Chicago are lighted by flat-flame gas-burners. In a few streets in the city, incandescent gas-burners are used; but the boulevards, squares, and a number of the streets are lighted by electric arc lamps from a plant owned by the city.

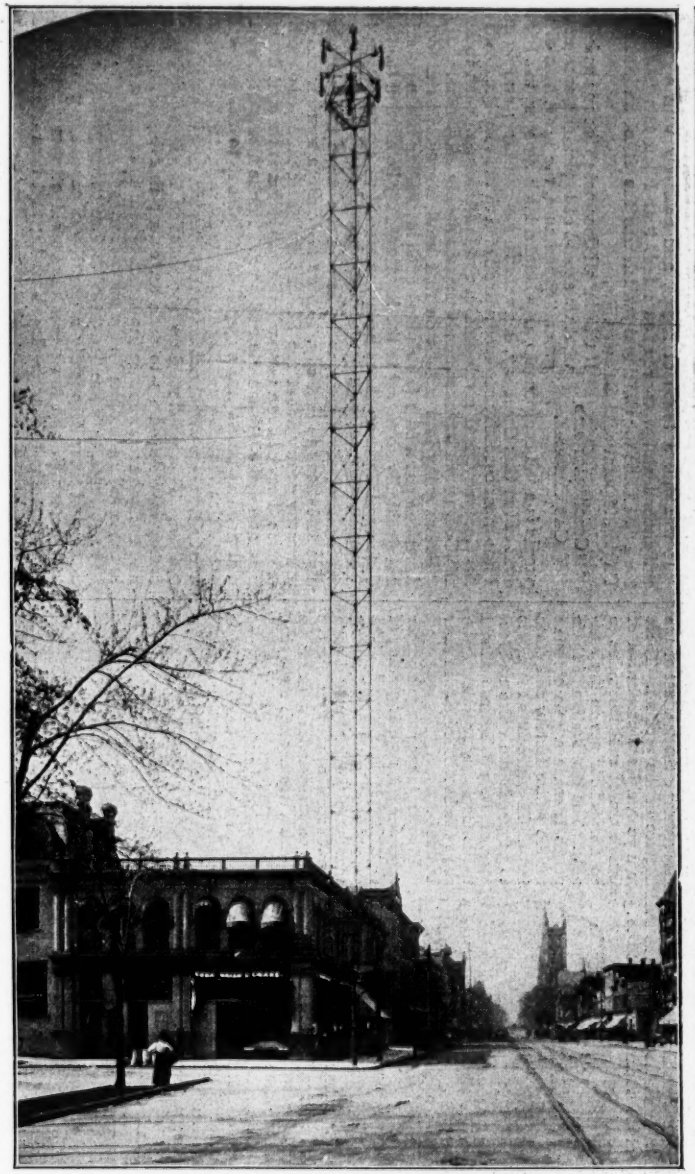
WHAT IS DONE IN DETROIT.

Detroit, my next stopping place, is a bright and attractive town; and during the last ten years its population has jumped from 50,000 to 285,000. Manufactured gas is there supplied for lighting at $1 per 1000 cubic feet, for stoves 80c., and for power 60c.; and for natural gas 28·18c. is charged, with a sliding-scale.

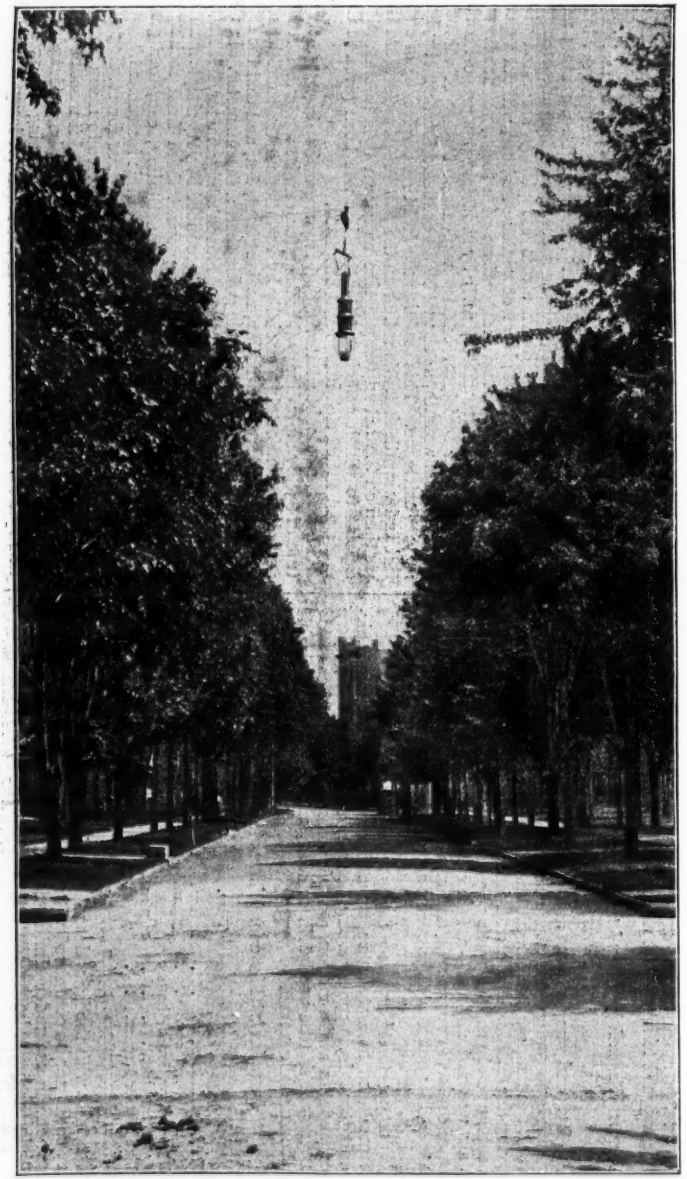
INSTALLATIONS FOR 36S.

Mr. H. D. Wallbridge is the Company's enterprising Engineer. He has initiated a method of fitting up houses which is quite an exceptional feature in the States. A seven-room house he fits with seven gas fixtures or fittings, and pipes all through complete, for $9, or (say) 36s. per house. The Company lose on this; but they consider the loss is more than returned by the first year's consumption, which would never have been obtained had the gas not been laid on in the houses. Gas-stoves, too, are hired on easy purchase terms; and the consumption tells. The amount of gas consumed has actually doubled by this means in two years. Two years ago the make was 350 millions; to-day it is 700 millions. Upon this, no comment is needed. The proportion of water gas and coal gas used is 50 per cent. each; the former, of which 2090 million cubic feet are consumed, is chiefly used for stoves and engines. I was told that this natural gas contains 2 per cent. of sulphur compounds, which

GAS-STOVES AND NATURAL GAS.



TOWER ELECTRIC LIGHTING EXTRAORDINARY.



AERIAL SUSPENSION.

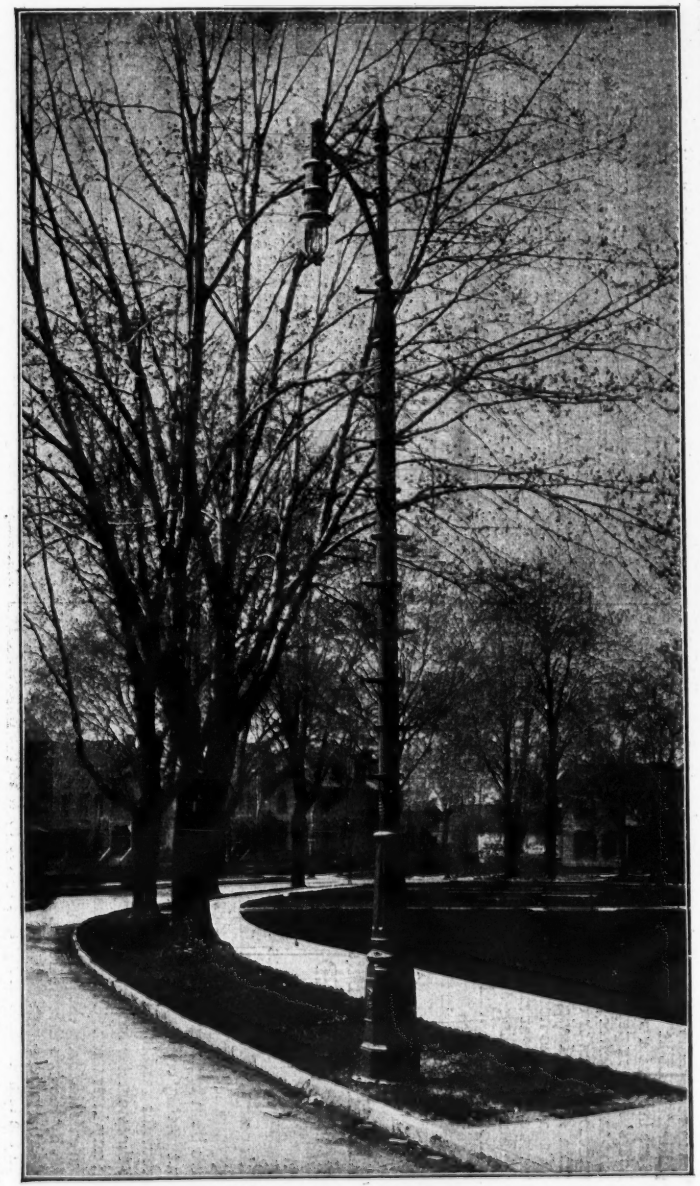
make it very offensive in use. The Engineer maintains that, owing to this amount of sulphur compounds, no cooking-stove has been made that is suitable for properly consuming natural gas. I may remind readers that at Pittsburgh I was informed that nearly all the cooking and heating was done by natural gas; and a very interesting theory, which, by those competent to judge, is regarded as most probably explaining the difference in the component gases of the Pennsylvania (Pittsburgh, &c.) as against Ohio and Indiana (Detroit, &c.) gas wells, is that the natural gas in Pennsylvania comes from the decomposition of terrestrial vegetation, from which no sulphur is given off, but in Ohio and Indiana it comes from deposit, in ages past, of marine vegetation, in which at least 2 per cent. of sulphur can be traced.

By energetically pushing the gas-stove business, Mr. Wallbridge fixed 6000 cookers last year; and he has also placed 3000 hot-plates, which are supplied *gratis* if the consumer pays for the tubing and the tap.

PUBLIC LIGHTING. As to the outdoor lighting the municipal electricity plant entirely furnishes the illumination for the streets; the lights being placed on high towers, or comparatively low posts, or suspended in other ways. The tall electric light towers are said to be found to be very efficient as an "incentive to astronomical observation;" but they are of little value to practical people as illuminating sources on a dark night. The Public Lighting Commission is composed of some very estimable and earnest gentlemen, who, if rumour speaks truly, will, in the course of a few years, possess experience and a worn-out plant, while the city will have achieved both distinction and liabilities for about a million dollars of lighting bonds. I give four illustrations of peculiar interest.

IN BUFFALO. With Buffalo I was most favourably impressed. It is a place replete with entertainment and interest, particularly on account of its proximity to the Niagara Falls, which supply electric power to many concerns. Here the Gas Company do not control the natural gas, which is a very awkward factor—the coal gas of 18-candle power being sold at a dollar, while the 12½-candle power natural gas is dispensed at 27½ c. The Company, however, have managed to hold their own, and still sell 500 million cubic feet of gas per annum. Gas-stoves have to be lent or given free; and every possible inducement is held out to the consumers to use manufactured gas. The President of the Company is Mr. A. C. Humphreys; and if it is possible for the manufactured gas to maintain its position in face of this terrible competition, he is the man to engineer and see it through. Last year, the Company just about managed to pay their way; but the ordinary shareholders did not receive any dividend.

PUBLIC LIGHTING. Both gas and electricity are patronized for the lighting of the streets of Buffalo. There are 5752 gas-lamps in the city, which are supplied with gas at $1 per 1000 cubic feet. The consumption per lamp is 4 cubic feet per hour; and the number of hours lighting per year is 3948½. For lighting, extinguishing, cleaning, and keeping the



A MODERN PIECE OF UGLINESS.

lamps in repair, the Company receive 17 c. per lamp per month. The Electric Light Company supply the remainder of the city with arc lamps, for which they get $100 each for the same number of hours' lighting per year. The arc lamps are supposed to be of 2000-candle power; but a little doubt exists on the point. No incandescents, gas or electric, are employed in the streets.

From Buffalo I visited Niagara Falls, and from there crossed into Canada. The items of interest to the "JOURNAL" readers concerning this great and promising country I will reserve for my fourth and concluding article, and say—in the words of the King of France in "All's Well that Ends Well"—

"Let us from point to point this story know,
To make the even truth in pleasure flow."

(*To be concluded.*)

THE ALLEGED DRYNESS OF AIR IN ROOMS WARMED BY GAS-FIRES.

By THOMAS FLETCHER, F.C.S.

This complaint as to the action of gas-fires is constantly making its appearance; and, with the object of finally deciding the matter, I have been making careful experiments for some time, in such a form that they can be repeated and verified by any observer. The hygrometer used is the ordinary Mason's pattern, a wet and dry bulb thermometer mounted side by side. These can be obtained from any instrument dealer or chemist.

The calculation of the percentage of moisture from the difference shown by the two thermometers is not simple enough for general use; but a good rough rule, sufficient for ordinary purposes, between the temperature of 45° and 65°, is to take the difference in degrees between the two thermometers, multiply this by 6, and deduct the product from 100. The result will give the percentage of moisture, taking complete saturation as 100. This is perfectly reliable for comparative observations between the effect of gas and coal fires at the same temperatures; and exact calculations are unnecessary.

The room in which the gas fires and stoves were tested is my own bedroom (24 feet by 16 feet), with two large windows; and the days selected were dull and wet—the outside air being completely saturated with moisture. The coal-fire was in a well-ventilated sitting-room of the same size.

Room Warmed by Incandescent Gas-Fire.

	Time.	Dry Bulb. Deg. F.	Wet Bulb. Deg. F.	Moisture. Per Cent.
No fire, window shut	11 a.m.	50·0	46·0	76
,, ,, open	3 p.m.	50·5	48·0	85
Fire full-on for 1½ hours, window shut	11 p.m.	56·0	51·0	70
Fire low for 8 hours	7 a.m.	54·0	49·5	73

Outside temperature: 11 a.m., 46°; 3 p.m., 46°; 11 p.m., 43°; 7 a.m., 43°.

Room Warmed by Coal-Fire.

The temperatures in this room were so constantly varying from 55° to 65°, that no series of correct observations was possible; but the greatest difference at any time between the wet and dry bulb, while the fire was burning, was 6°, and the average 5°, showing 70 per cent. of moisture—precisely the same as with a gas-fire. Of course, in making these experiments, the thermometers must not be exposed to any direct radiant heat from the fire.

Rooms Warmed by Incandescent Gas-Fire with Warm-Air Arrangement.

The fire used was the same as in the previous tests, with an air-warming arrangement added. This had 4 square feet of heating surface, the temperature of which was well below 212°, to prevent charring the dust in the air, and consequent smell. The increase of heating power with this was 16 per cent.; and the moisture in the air was not affected—a fact clearly shown by the figures. This, of course, is very small, and of a low power for a warm-air arrangement; but it is as powerful as can be comfortably used in a living-room where the occupants are at rest. When the outside air is comparatively dry, any dryness in the outer air is added to that produced in a warm room; and on dry days a larger air-warming and drying power would be unpleasant. In rooms where the occupants are in motion, a much more powerful air-warming arrangement can be used with comfort, and is, in fact, desirable for economical reasons.

Incandescent Fire with Warm-Air Arrangement.

	Time.	Dry Bulb. Deg. F.	Wet Bulb. Deg. F.	Moisture. Per Cent.
No fire, window shut	11 a.m.	48	45	82
,, ,, open	3 p.m.	49	46	82
Fire full on for 1½ hours, window shut	11 p.m.	58	53	70
Fire low for 8 hours	7 a.m.	56	51	70

Outside Temperature: 11 a.m., 47°; 3 p.m., 48°; 11 p.m., 44°; 7 a.m., 42°.

The tests with the incandescent gas-fire with warm-air arrangement could not be compared with a coal or coke fire-stove, as we have none in use under similar conditions; but an attempt was made in the boiler-house connected with the plant-houses. This is warmed by the diffused heat from the surface of a self-contained vertical boiler; and with an external temperature of 44°—the air being saturated with moisture—the temperature ranged from 59° to 60°, and the moisture from 50 to 64 per cent. This variation in the moisture at the same temperature can be accounted for and reproduced at will; but it has no bearing on the present subject, and, therefore, need not be dealt with further.

Flueless Gas-Stoves.

As these are largely used in rooms which are not properly ventilated, it is desirable that they should be included in the series of experiments. During the combustion of 30 cubic feet of gas, about 1 pint of water is formed; and this would all be condensed on the walls and windows, but for the fact that the rise in temperature caused by the combustion increases the proportion of moisture the air will absorb without saturation. But in the absence of ventilation, when the gas is extinguished and the temperature falls, this extra moisture is condensed on the walls, windows, and contents of the room; and, therefore, it is impossible to dry a room under ordinary conditions by the use of any flueless gas-stove.

The following tests were made in a room without ventilation, 10 ft. 3 in. by 18 ft. 6 in. and 12 ft. 3 in. high; cubic area, about 2100 feet; gas consumption, 14 cubic feet per hour; area of glass in windows, 50 square feet; outside temperature, freezing:—

	Dry Bulb. Deg. F.	Wet Bulb. Deg. F.	Moisture. Per Cent.
Before lighting	43·5	39·0	73
After 1 hour	52·0	47·5	73
,, 2 hours	56·0	57·0	70
,, 3½ ,,	60·0	53·0	58

The want of ventilation was very appreciable; the room feeling hot and close.

Repetition of the above, with door open 2 inches. Outside temperature, 42°:—

	Dry Bulb. Deg. F.	Wet Bulb. Deg. F.	Moisture. Per Cent.
Before lighting	50	46	76
After 1 hour	58	53	70
,, 2 hours	61	55	64
,, 3½ ,,	65	57	52

Opening the door wide for an hour, caused a drop in the temperature of 12° in both wet and dry bulb thermometers. In both the tests with flueless stoves, the moisture condensed on the windows and walls was distinctly acid to test-papers; showing the presence of sulphur in the products of combustion.

To prove that the so-called feeling of dryness caused by gas-fires with flues had another source, which I have always suspected, the sheet-iron flue-elbow was removed, allowing a small quantity of the products of combustion to escape into the room. The unpleasant feeling of dryness in the throat and nostrils was soon appreciable; and this is evidently caused by a trace of sulphur in the products of combustion escaping—a fact easily proved by the reddening of a strip of blue litmus paper—showing that the alleged fault of gas-fires is caused entirely by defective flues.

The same result as regards the presence of sulphur compounds on thick, damp days, or in fogs, will be found in the open air in London. Litmus paper becomes red when it touches the moisture on walls and windows, or the mud in the streets; and it is acted on by the air in railway tunnels. The whole atmosphere of London in damp weather has a strong acid reaction. In fact, in November I was unable to obtain in London any blue litmus paper (although kept in corked bottles) which had not been more or less acted on by the sulphuric acid present in the air. Most of this acid is, of course, produced by the combustion of coal.

In an inhabited room, from 58 to 72 per cent. of moisture, shown by a difference of 6° to 8° between the wet and dry bulb thermometers, in a room about 62° Fahr., will be pleasant; and this is easily obtained with either a coal or an incandescent gas fire, except when the outer air is completely saturated with moisture. A transient gleam of winter sunshine, without appreciably altering the actual temperature of a room, at once lowers the wet-bulb thermometer, and, by reducing the proportionate excess of free moisture, causes a pleasant feeling of warmth, although this warmth, as shown by an ordinary thermometer, has no real existence. This explains the fact that the feeling of comfort and warmth depends rather on the amount of moisture in the air than on the actual temperature as shown by a thermometer, a point to which sufficient attention has not been given in the management of sick-rooms and hospitals.

There is no doubt whatever that any room showing a temperature of 65° by an ordinary thermometer, can be made to feel hot and close, comfortable, or chilly by variations in the conditions as regards moisture, ventilation, radiant heat, &c., and that the feelings are a much more reliable guide than a thermometer. In the printed instructions for the use of Mason's hygrometer, it is stated that an "artificial locality may be produced by very simple means; and those whose circumstances prevent them from seeking a climate suitable for their peculiar constitution, can, to a great extent, obviate the necessity by the use of this instrument."

I trust that the very simple rule given above for reading and calculating the indications, will prove of service to many invalids who are unable to select a suitable climate; and it must be borne in mind that the necessary conditions can only be produced with certainty by a gas-fire, with or without air-warming arrangement, as required. Coal fires and stoves are much too irregular in their

results to be reliable, though, where gas is not available, approximate results may, with careful management, be obtained. A coal-fire alone will not meet all cases. A steamer to moisten the air is often used, when it is already nearly saturated, and the reverse effect is really required. An additional means of controlling the percentage of humidity is necessary; and this would possibly be done best by an oil-stove, with a flue to remove all the products of combustion, which are quite out of the question in a sick-room.

PERSONAL.

Mr. GEORGE HALE, Manager of the gas-works at Stevenage, Herts, has been appointed Manager of the new works about to be erected at Freshwater, Isle of Wight; and he will commence his duties almost immediately. There were some 70 applicants for the position, advertised in the "JOURNAL" for the 22nd ult.

Early in December an advertisement appeared in the "JOURNAL" (No. 3612) requesting applications for the position of Manager of the Gas Department of the Perth (Western Australia) Gas and Electric Light Company. We learn that Mr. W. G. QUICKE, of Bath, has been appointed, and is leaving England early next month to take up his new duties.

At the usual monthly ballot last Tuesday, Mr. R. F. BAKER and Mr. W. A. BOOTHROYD, students of the Institution of Civil Engineers, were admitted as associate members. The former gentleman is engaged upon the Neuadd Water-Works at Torpantau, Merthyr Tydfil, and the latter upon those which are now being carried out at Pembury, Tunbridge Wells.

The Chairman of the Newport (Mon.) Gas Company, Mr. R. LAYBOURNE, J.P., occupies a position in the gas world which we may well suppose is shared by very few other gentlemen at the head of gas undertakings in the United Kingdom. When moving, as is now generally done at meetings of public bodies, a vote of condolence with the Royal Family in their recent bereavement, and of loyalty to the Throne, he made the interesting statement that he had lived in five reigns—the two Georges, William IV., the late Queen, and his Majesty Edward VII.

Mr. JOHN M'CUBBIN, Gas Engineer of the Chorley Corporation, who, as already announced in the "JOURNAL," has obtained the appointment of Resident Engineer of the Hong Kong and China Gas Company, Limited, left England on Thursday last, in the *Australia*, to take up his new duties. Before leaving Chorley, he was presented by the officials and employees of the Gas Department with a suitable token of the high esteem in which he was held by the whole of the staff. A pleasant gathering took place at the Imperial Hotel—Alderman H. N. Whittle, the Vice-Chairman of the Gas Committee, presiding, in the absence of the Chairman through indisposition. In presenting Mr. M'Cubbin with a handsome gold lever watch and albert chain, together with a framed photograph of the staff, he remarked on the progress made since that gentleman's advent in 1895. Mr. M'Cubbin thanked the donors for their kindness, and expressed his sorrow at leaving the many good friends he had made in Chorley. Remarks were also made by Mr. J. W. Allin, who succeeds Mr. M'Cubbin, and others. The inscription on the watch was as follows: "Presented to Jno. M'Cubbin, Esq., on the occasion of his leaving Chorley for Hong Kong, by the officials and employees of the Chorley Corporation Gas Department. January 31st, 1901. Our best wishes go with you."

OBITUARY.

Mr. JOHN TURNBULL, late Gas Manager at Lauder, died at Gas House, Wisp, Portobello, on Monday last week, at the age of 75.

Mr. R. CRANFORD, who was Secretary of the Dartmouth Gas Company from its formation, upwards of thirty years ago, down to last year, died on the 5th inst., in his 72nd year.

The death is announced of Mr. WILLIAM CLIFT, a native of Cornwall, who in early life went to California, where he spent the rest of his days. He was a Director of the Pacific Lighting Company, the Eureka Lighting Company, and the Pacific Gas Improvement Company.

The Joint Boards of B. Gibbons, Jun., Limited, and Gibbons Bros., Limited, Dudley, notify with regret the recent death of their co-Director, Mr. BENJAMIN GIBBONS, who had been connected with the former business for upwards of 35 years, and with the latter from its commencement.

The funeral of Mr. JOHN READ, Secretary and General Manager of the Tunbridge Wells Gas Company, whose death was announced last week, took place on Friday, at the Borough Cemetery. In addition to the above-named Company, Mr. Read was connected with the Tonbridge, East Grinstead, and Sevenoaks Gas Companies. He was 70 years of age, and has left a widow, two sons, and three daughters.

The "Transactions" of the North British Association.—We have received the report of the proceedings at the meeting of the North British Association of Gas Managers held in Edinburgh last July, under the presidency of Mr. W. Ewing. Following the rules, lists of members, and the accounts of the Association, is the "Statistical Report of the Gas Supply of Scotland from July 31, 1899, to Aug. 1, 1900," compiled by the Committee.

TECHNICAL RECORD.

INSTITUTION OF GAS ENGINEERS.

The Annual General Meeting of the Institution commenced on Saturday, at the Offices, No. 11, Victoria Street, S.W. The PRESIDENT (Mr. James W. Helps, of Croydon) was in the chair.

CONFIRMATION OF MINUTES.

The SECRETARY (Mr. Thomas Cole) read the minutes of the annual general meeting in February and May last year, and they were confirmed.

CONDOLENCE WITH THE ROYAL FAMILY AND CONGRATULATIONS TO THE KING.

The PRESIDENT said the Council had been considering the question as to whether they ought not, as a society, to pass a vote of condolence with the Royal Family on the death of Her Majesty the late Queen, and congratulations to the King on his accession to the Throne. This had been done in the case of most other bodies of a kindred character—such as the Municipal Engineers. It was proposed to have the resolution properly drawn up, and engrossed on vellum. All he had to do on this occasion was to ask the meeting to endorse the proposition of the Council.

This was immediately done.

AN INTERNATIONAL ENGINEERING CONGRESS IN GLASGOW.

The PRESIDENT next read an announcement he had received respecting a proposal to hold an International Engineering Congress, in connection with the Glasgow Exhibition, during the first week of September. From the communication, it was gathered that the first steps towards the organization of this meeting of engineers representative of the chief branches of engineering practice were taken by a Committee appointed by the Institution of Engineers and Shipbuilders in Scotland. A London Committee has been formed to assist and advise in the organization; and the idea has been heartily supported by the leading engineering Institutions of Great Britain. Particulars were also supplied as to the organization and scope of the work. Meetings will be held for the reading of papers by the kind permission of the University Court, in the University Buildings, which are in immediate proximity to the Exhibition. It is intended to make arrangements whereby all the members of the Congress will have the right of free entry to the Exhibition during the week. Besides the reading of papers, visits to works will be made on Sept. 3, 4, and 5; and special excursions to places of interest are proposed for the 6th. The Honorary President of the Congress is Lord Kelvin; the President is Mr. James Mansergh, who is President this year of the Institution of Civil Engineers; and the General Secretary is Mr. J. D. Cormack, of Glasgow University. The Congress will be divided into several sections, of which gas, water, and electrical engineering will form three. Further detailed information will be published in due course. It may also be mentioned that the time fixed for the Congress is considered the most appropriate as the British Association will be meeting in the city during the succeeding week.

After reading the communications, the PRESIDENT proceeded to state that the Institution received an invitation from the Glasgow Committee, asking them to take charge of the Gas Section. The Council accepted; and they had had several meetings. They were asked to appoint a President of the section; and Mr. George Livesey had kindly consented to take that position. For the Honorary Secretaryship of the section, he (Mr. Helps) had been chosen. Three Vice-Presidents were required; and the proposal was that Mr. William Foulis, of Glasgow, Mr. W. R. Herring, of Edinburgh, and Mr. T. O. Paterson, of Birkenhead, the President of the Gas Institute, should also be asked to serve. The Council, after discussing the matter thoroughly, considered it was not intended that the Institution, in taking charge of the section, should treat it as in any way appertaining to themselves, but that it was intended they should act for the gas industry at large, and treat it as a whole. With this object in view, the Council decided, at their last meeting, to ask the Gas Institute to co-operate with them, and to nominate ten of their members to act on the General Committee for the section. Then they were writing to gentlemen connected with the gas industry, but not identified with either of the Institutions, asking them to also join the General Committee. A suggestion would then be made that, from the General Committee an Executive should be appointed (preferably, for convenience and consultation, gentlemen resident near London) to formulate a scheme for carrying out the conference. He had also written to the various Gas Associations on the Continent and in America asking for a paper from each; and it was the intention of the Glasgow General Committee to invite delegates from these various societies abroad. On the whole, he thought the Congress would be a very big affair. A Special Committee was being formed in London, of which Mr. Livesey and he (the President) were members. Each member joining the Congress would pay half-a-guinea; and this would admit him not only to their own section but to the meetings of the other sections, as well as entitling him to free admission to the Exhibition for the week. With regard to the publication of the papers, the General Committee had decided to publish

abstracts only in all sections; and each member would be supplied with a copy. It had been suggested to those to whom he had written so far asking for papers, that the communications should not be long, but more after the style of the papers submitted at the conference of the Institution of Civil Engineers. With regard to entertainment, in addition to the excursions, the Lord Provost and Corporation of Glasgow had announced their intention of receiving and entertaining the members of the Congress. As soon as possible, he should, as Honorary Secretary, send a communication on the subject of the Congress to each member of the Institution and Institute; and he believed the matter was also coming before the Council of the Gas Institute at their meeting that day. In concluding his remarks, the President emphasized this—that the Council of the Institution did not seek the honour of taking charge of the section; they were asked to do it, and accepted the duty.

Official Appointments and New Member and Associates.

The Scrutineer (Mr. H. Iago), having examined the ballot-lists for the election of officers and members, reported that the following gentlemen had been elected to take office:—

President—Mr. Walter R. Herring, of Edinburgh.

Vice-President—Mr. Thomas Holgate, of Halifax.

*New Members of Council**—Mr. Arthur E. Broadberry, of Tottenham; Mr. Samuel Glover, of St. Helens; and Mr. Charles Wood, of Bradford.

Auditors—Mr. Magnus Ohren and Mr. Alfred Lass.

* The other Members of Council are: Mr. W. D. Gibb, of Newcastle-on-Tyne; Mr. T. S. Lacey, of Pimlico; Mr. C. Meiklejohn, of Rugby; Mr. H. Morley, of Cardiff; Mr. J. Tysoe, of East Greenwich; and Mr. G. Winstanley, of Coventry.

The following names were added to the Institution roll:—

Member—Mr. A. W. Onslow, Engineer of the Woolwich Arsenal Gas-Works.

Associates—Mr. C. A. Cunnold, of Fulham; Mr. H. J. Ibbotson, of Newport, Isle of Wight; Mr. W. G. Quicke, of Bath; Mr. A. H. Solomon, of Fulham; Mr. E. B. Tomlinson, of Birmingham.

The President congratulated Mr. Herring on his election to the presidency, and then declared the meeting adjourned to the 1st of May and following day at the Institution of Civil Engineers.

POWER GAS AND LARGE GAS-ENGINES FOR CENTRAL STATIONS.

A Special Meeting of the Institution of Mechanical Engineers was held last Friday to complete the discussion on Mr. H. A. Humphrey's paper on the above subject, which, as readers are aware, has been under consideration at two previous meetings. Practically the whole of Friday's sitting was again occupied with the matter; but apart from Mr. Bryan Donkin's remarks and the reply of the author, there is little which, in view of the fact that we did not publish the whole of the diagrams and the appendices to the paper, we are called upon, or need, to report.

Mr. Bryan Donkin (London) added his appreciation of Mr. Humphrey's excellent paper, which, he said, was full of facts and figures, fortunately with a minimum of opinion, but much original matter. The subject of the production of cheap power gas, and its utilization, was of great importance—to obtain the cheapest power with the lowest grades of coal, either with or without recovery plant—especially in these days of great developments of power for electrical energy for power and light. Referring, in the first place, to the 400-horse power Crossley two-cylinder gas-engine test, every care seemed to have been taken to make a first-class experiment. The special study and plotted results of forces and turning moments with the speed variations during a cycle of two revolutions were very interesting, and must have taken much time. The degree of compression in the test, however, was to him disappointing, as it was only four atmospheres. He should have liked to have seen it about eight atmospheres, as the maximum explosion pressure was about 16 atmospheres. In his paper, Mr. Humphrey mentioned particulars of a 650-horse power gas-engine; and he used these words in connection with it, "now one of the largest two-cylinder engines in existence." He (Mr. Donkin) could not agree with this; and he presumed the author meant in England, as there were many of 1000 or 1500 horse power working on the Continent. Turning to the Mond producer, he said this seemed an excellent one, and was, he believed, the first to produce cheap gas from bituminous slack coal. Coke or anthracite, as those present knew, had been chiefly used hitherto; and, of course, the cost in most localities was at least double or triple the price per ton of the small coal used in the Mond producer. This was an important difference. Another point about the Mond producer was that it might be classed as one of the temperance type; seeing the enormous quantity of steam or water going into its interior—about 2½ tons for every ton of coal for converting into hydrogen and keeping its temperature down. He (Mr. Donkin) thought it might be interesting if he next referred to a selection of twelve gas-engine experiments on power or generator gas of a heating value of only about 150 thermal units per cubic foot, and also six tests with gas-engines working with natural gas in the United States—simply gas tapped from the earth, and costing next to nothing. This natural gas had a heating value of about 1000 thermal units per cubic foot. The tests were arranged in the order of merit of thermal efficiency of brake horse power; and the powers varied from 60 to 600 brake horse power. The maximum heat efficiency per brake horse power with these very different gases came out, curiously enough, about the same whether they had a poor or rich gas—viz., about 25½ per cent. Referring to the modern tendency of gas-engines, he said they seemed to run somewhat on the following lines: Greater compression, better shaped clearance space, water-cooled pistons in many cases for large powers, positive scavenging by means of a special air-pump, and electric ignition, which was largely used on the Continent, but in England makers seemed to stick more to tube ignition. Then, double-acting engines were again coming in, as would be seen by the latest one made by Körting, of Hanover. With regard to the piston speed of large engines, this seemed to be also on the increase. For example, a 1000-horse power motor had about 1000 feet per minute piston speed, which was about the same as, or a little higher than, the best steam-engines. Alluding to producer gas, he quite agreed with the author that with gas practically little or none was lost even in miles of pipes; whereas they all knew that, with steam, even a few yards made a considerable difference in respect of condensation. Next they were told in the paper that Mond gas was being sold at 2d. per 1000 cubic feet with large plant. This, of course, was a remarkably low figure; and he supposed it included some profit. For the smaller plant spoken of—say 250-horse power—he presumed the price per 1000 cubic feet would be a good deal more. The heat efficiency of the producer for large plant seemed very high—viz., 80 per cent. and more; but it was not quite clear whether the coal used to produce the large quantity of steam required had been included in the heat balance. He also asked whether there was any smell or smoke from the Mond producer when the gas-engine was stopped, as this might be important in some cases. Among other points on which he sought for enlightenment were, as to the pressure of air for the air-blast in inches of water, and whether any fine dust or dirt came over into the gas-main from the producer as with blast-furnace gases. This had given a good deal of trouble in many cases. With regard to the heat units used in some parts of the paper, he raised a protest. Thermal units and metric calories were both well known to all, and were much used; but to introduce a third type—multiplying by degrees centigrade—was very puzzling. To avoid confusion, he also thought the higher and lower calorific values of the gas used should be given in each case. He believed Mr. Humphrey said the heating values mentioned in the paper were the higher calorific values. In England, America, and Germany and most countries, the lower heating value was always accepted as the right one, and only in France the higher heating value was adopted both for gas and other fuels. This, of course, also affected the thermal efficiency of the gas-engines. The question wanted settling once and for all by some committee of scientists; and he suggested a reference of the matter to the Gas-Engine Research Committee of the Institution. He concluded with some remarks on the heat efficiency of engines, which he regarded as an excellent figure of merit—it having the advantage of allowing comparison to be made correctly between oil, gas, and steam engines. "Heat efficiency," however, should always, he considered, be given per useful or brake horse power. Some results from reliable modern tests of different engines completed a speech of some length which was listened to with much attention.

Professor William Robinson remarked that the facts and figures in the paper appeared to him to show progress of the greatest importance to all engineers interested in the economical conversion of the heat energy of cheap fuel into useful work. He paid a tribute to the work of Mr. Dowson, referred to his many imitators, and pointed to the several attempts that had been made to use bituminous coal for power gas, and to the difficulties encountered. The record in the paper of results obtained in the continuous working of large engines driven by Mond gas proved how thoroughly the difficulties had been overcome. He described the distinctive feature of the Mond process of gas making, which was rendered regular by what he described as low-temperature regeneration. In May and June last, he (Professor Robinson) had the opportunity of inspecting the 1000-horse power plant at Sandiacre, driving the 500-horse power Premier engine before it went to the works of Messrs. Brunner, Mond, and Co. He then made some measurements of the gas used, and the coal from which it was produced. The heating value of the gas was about 150 British thermal units per cubic foot, at 60° Fahr. and atmospheric pressure. The engine was running; and, using the bell of a gasholder to measure the quantity of gas used, one could see that the consumption would come out to indicate an efficiency of about 30 per cent. What he noted specially was the remarkable uniformity in the quality of the gas. This seemed characteristic not only of the gas plant at Sandiacre, but of the large one at Northwich; and it had an important bearing upon the use of gas in gas-engines. The constancy in quality was undoubtedly due to the low-temperature regeneration. With reference to the point raised by Mr. Dugald Clerk regarding the data as to the quantities of carbon, hydrogen, and fuel, he (the speaker) had gone carefully

through the figures in the paper, and was convinced of their accuracy. Taking the quantities of carbon and hydrogen in 1 kilo. or 1 lb. of coal, and the carbon and hydrogen found in the gas and in the steam that was decomposed, and the figures agreed exactly, provided they took 1 kilo. of the moist slack to produce 3·6 metres of dry gas at 0° and atmospheric pressure. At the same time, one would like to have the weighing of the slack and the measuring of the gas made and used directly in the engine. But clearly, in a large plant, this would be very difficult to accomplish. He devoted his following remarks to proving the high efficiency of the Mond producer; and from the figures he gave, he arrived at the conclusion that the ratio of the heating value of the gas to the heating value of the coal used came to almost exactly 70 per cent. Many points in gas-engine practice and working were next commented upon by the speaker. Among them he alluded to the trouble that arose when a given ignition for a certain richness of gas was arranged for and the quality of the gas varied. Even with coal gas, testings in the morning and evening revealed differences in the pressure and in the quality; and these variations, when an engine was set for ignition at a certain time of the stroke, were very important. Of course, it could be partly overcome by positive scavenging, but not completely. Another matter remarked upon was the detrimental influence of the heating up of the cylinders of large engines, through the heat not having time to get through the thick walls of the cylinders to the water jacket.

Mr. W. J. Crossley asked permission to say a few words as to the way some of the figures given by Mr. Humphrey were arranged, as they were of such absolute importance to his firm. At the first meeting the thermal efficiency of the Premier engine was given on what was called the lower scale and of the Crossley engine on the higher scale. He corresponded with Mr. Humphrey, who promised to put it right; but he (Mr. Crossley) thought he ought to point out what an extreme difference it made to them. Taking one example, he found the Premier engine, put on the lower scale, gave a thermal efficiency of 25·6; whereas their engine put on the high scale came out at only 21·8. Of course, if these two figures were arranged in parallel order, it was very disappointing. If the Crossley engine was put on the lower scale, it came out 24·4, which was only 1·2 behind the Premier engine; and as Mr. Humphrey had been so kind as to give a 1 per cent. improvement on their engine, they were only 0·2 behind the Premier. This was a magnificent performance considering their compression was less than half that of the Premier, and their engine was much more simple. Another point he should like to mention was that, on the high scale, their old 60-horse power engine (which had been working for years), if it were calculated on the lower scale now, would come out at 24·9—a good performance, it seemed to him, for an engine of that age and size. Then it seemed to him also that, if they were calculating their engine in the ordinary way as if it had 120 lbs. compression, they would bring up the efficiency to 28. He further urged that the figures should be arranged in the order of merit, and on the same scale; but he only wanted what was strictly fair. Touching upon Professor Robinson's remarks, he pointed out that his firm had been running their engines for twenty years on Dowson gas; and they had not experienced the trouble described.

Mr. E. B. Ellington said, with reference to the gas-producer, it seemed to him it would mark an era in the mechanical use of low temperatures. It was only in that one direction in which any great economy in the thermal dynamic machines remained to be obtained. The gas for use in gas-engines, on the point of thermal efficiency, seemed to be so very good that he rather regretted that in the paper there had been a certain line of argument which he thought contained a great fallacy. That fallacy was in connection with the Mond producer gas and the sulphate of ammonia process. It seemed to him that, when there were two products from an operation or a series of operations, and when dealing with the matter from a scientific point of view and entering into questions of economy, the only basis on which they could get any definite conclusions was that the value of the two products must be taken for what they were worth in the market; and therefore he thought it was a mistake to debit to the cost of the coal the value of the sulphate of ammonia produced. This line had been rather unfortunate. Among other criticisms he pointed out that the cost of coal was taken at several different figures. For instance, he noticed in one place slack was taken at 5s. and coal at 12s. per ton; whereas the thermal value of the two fuels as given in the paper would make the relative prices 10s. and 12s., and result in a considerable difference in the cost per unit. The speaker also entered into questions relating to central power station costs.

Mr. Ewing Matheson, who is concerned in the considerable use of power both in the Midlands and North country, regretted the little useful information that the discussion had afforded for the guidance of users of motive power.

Mr. J. H. Hamilton, of the Premier Engine Company, thought it strange that gentlemen of Mr. Crossley's and Mr. Atkinson's experience should have taken the results of an engine working at two-thirds its load and compared it with an engine working at full load. If the Premier engine had been working at full power, it would have indicated 650-horse power. The thermal efficiency had also greatly improved. Other points were referred to by the speaker with the view of showing the superior merits of the Premier engine.

Mr. W. C. Goodchild (Derby) supplied some particulars as to the gas plant put down at Leicester in 1894 by the Midland Railway Company, and the results of experience there.

Mr. Humphrey, in replying on the discussion, said he felt it was necssary to make a few general remarks. In the first place, his paper dealt primarily with certain experiments in the use of a particular gas in gas-engines for the production of power. All the details relating to the gas and to the experiments had been presented in a scientific spirit; and he had no apology to make for not having written a historical preface mentioning all other known kinds of gas-producers. The paper, as first submitted to the Council, contained no account of the Mond producer plant; and this was added later at the special request of the Secretary. There were other well-known plants for the production of power gas; and it would have been an easy matter for him to have given facts and figures relating to them. But he had two excellent reasons for not doing so. First, his paper had already exceeded the usual limits of length by occupying over 70 pages; and, second, if ever comparisons were better omitted it was when the advantage was all on one side. Mond gas was so very much cheaper than any other producer gas suitable for power purposes that he felt, if anything was to be said of other plants, it should come from the makers themselves, who had every opportunity to attend the discussion or join in the correspondence. Commencing with the discussion at the meeting on Dec. 14, he said, in regard to Mr. Crossley's remarks on the 400-horse power gas-engine which his firm supplied to Messrs. Brunner, Mond, and Co., that he was equally certain with Mr. Crossley that the adoption of water-cooled pistons, higher compression, and some means of doing away with fluid losses, would easily increase the thermal efficiency of the engine to 30 per cent. or over. The system described by Mr. Crossley, of cutting off the gas and air mixture at variable portions of the stroke, according to the work to be done, should give good results; but he (Mr. Humphrey) was afraid Mr. Crossley had patented it without knowing that the system was in actual use. Mr. C. E. Sargent had even gone one step farther. In starting his engine, he ignited at the cut-off point, and worked on the old Lenoir cycle until sufficient speed was obtained. Mr. Crossley spoke highly of the small Mond plant now used for supplying the driving-engines of his workshops with power-gas, but mentioned a small difficulty of having to renew the sawdust in the scrubbers somewhat too often. It might be interesting to learn that for the last nine months the number of changes of sawdust in the scrubbers at the Winnington power-house, had been a total of seven; and as each meant the use of two bags of shavings and four bags of sawdust, the total materials for filtering the gas amounted to 28 bags of sawdust and 14 of shavings. As two men could easily clean a scrubber and re-fill it in half a day, they had for the nine months: Cost of labour, 28s.; (say) fourteen bags of sawdust, 14s.; and seven bags of shavings, 4s.—a total of 46s., or at the rate of 4d. a day for a 1000-horse power plant working continuously. Before leaving the subject of the Crossley engine, Mr. Humphrey supplied a number of figures regarding its operation, and then followed with the results of a recent test of the Premier engine. Proceeding, he remarked that Sir Frederick Bramwell had for many years past pointed to a possible useful employment of gas as a medium for the transmission of energy, and had consistently held the view, even in the early years when the gas-engine had its times of darkness and difficulty, that the internal combustion engine had a great future. It was interesting to know that another great engineer, Sir William Siemens, had, so long as 35 years ago, endeavoured to obtain permission to establish gas-generators at the coal-pits for the distribution of cheap gas. Now it appeared such things were to be realized; and parliamentary powers were to be sought for the erection of gas-producers and the distribution of Mond gas in the South Staffordshire district under conditions much more advantageous than any which existed before the Mond system was introduced. Mr. Isaac Carr wished to know something about the tar; and the best proof he (Mr. Humphrey) could give him that very little tar was made by the Mond system was this: The tubular regenerators through which the gas passed direct from the producer never required to be burnt out as was done in other systems; and any dirt collected from these pipes was in the form of a dry dust which would run through an ordinary cock like sand. Also the acid liquor which met the gas before the final washing of the latter might be expected to gather much tar by continuously circulating in contact with the gas; but the quantity was so small that it was only sufficient to make the solid sulphate of ammonia subsequently formed by evaporating the sulphate liquor—grey instead of pure white. The small quantity of tar separated from the washers, the regenerator towers, and the gas-mains could not be said to possess any money value, although in a Mond plant in the United States it was actually collected and distilled, and the pitch and heavy oil sold. On the question of ammonia recovery from town's refuse, various experiments had been made; but he must remind Mr. Carr that the paper dealt with the question of producer gas for central stations, and for this purpose the use of town's refuse could not be admitted. Turning to Mr. Carr's questions as to the quality of coal, Messrs. Brunner, Mond, and Co. had about fifteen to twenty contracts running for the supply of different kinds of slack. It never happened, even for a single day, that one quality of slack was exclusively used in the producers. However, speaking generally, the bulk of the slack used came from the Nottinghamshire and Lancashire districts. There were some slacks, which, owing to their melting and caking into solid masses at low temperatures, were not so suitable for use in producers, as they needed the addition of mechanical apparatus, which it was better if possible

to do without. Coming to Mr. Dowson's remarks regarding the use of gasholders, in the paper he (Mr. Humphrey) emphasized the fact that the supply of gas from Mond producers could be regulated automatically to be just equal to the demand. Although gasholders were not used at Winnington, cases would occur where they would be advantageous, and he illustrated a small plant fitted with a gasholder. He must, however, dispel the idea that large mains acted to any considerable extent as reservoirs of gas, in the same sense that a holder was a reservoir. As the pressure in the mains at Winnington did not usually vary $\frac{1}{8}$ of an inch of water-gauge, the capacity of the mains did not vary $\frac{1}{1000}$ of their volume. It was only the pipes near the engines in which the fluctuation was easily measured; and there the liberal use of gas-bags close to the engines was desirable. Mr. Dowson raised the question of the presence of carbonic acid in Mond gas, and then suggested the correct answer by saying that "this was doubtless compensated for to a certain extent by the high percentage of hydrogen." The facts proved that the compensation was not partial but complete, and constituted a sufficient justification for the Mond process looked at from that point of view; for even on the carbon basis, the heat units in the gas per kilo. of carbon exceeded that with any other producer. But other advantages of the system came out prominently; thus low temperature working and recovery of bye-products would be impossible without the formation of carbonic acid and hydrogen. What really concerned engineers was the fact that the ratio of the heat energy in the coal to the electric or mechanical energy from the gas-engine was greater than for any other system; and going one step farther the fuel cost per brake or electrical horse power was still more favourable owing to the use of cheap fuel. It would not come as any surprise when he said that a gas-engine worked much better and more smoothly with producer gas than with lighting gas, and that it was possible to get as good a thermal efficiency with the one as with the other. Dr. Mond even advocated the use of still poorer gas; and the method of putting back some of the exhaust gas from the gas-engine into the producer, and so reducing the calorific value per cubic foot while increasing the total volume, had led to very good results. It was desirable to mention here, at the risk of saying once again what was known to all who had studied the gas-engine, that a pure explosive mixture like methane and oxygen, even if it could be used in a gas-engine, would give but a very poor thermal efficiency. Also to get good results with ordinary coal gas, the presence of inert gases, which took no part in the actual combustion, were necessary; and it was only when they dealt with a poor gas that they could approach the theoretical mixture for combustion. The reason was found in the fact that certain chemical and physical causes limited the temperature which it was possible to reach in a gas-engine cylinder. So long therefore as this limiting temperature was not lowered materially, a poor gas stood on as good a footing as a rich one; and relatively large quantities of nitrogen and carbonic acid could be present without any loss in thermal efficiency, and with a considerable gain in smoothness of working. The increase in diameter in a gas-engine cylinder necessitated by the use of a poor gas was not considerable; and the cost of an engine to develop the same power with Mond gas instead of lighting gas was not a factor of great importance. Mr. Dowson did not follow the idea that it would be desirable to work a small Mond plant without recovering the ammonia. But surely it was clear that, even without ammonia recovery, the use of cheap bituminous fuel still carried all its advantages, and rendered the fuel cost per horse-power very much lower than where anthracite or coke was used. The information given in the paper was not intended for the use of small consumers of electrical energy, but rather for engineers who had the designing of large power stations, or for the owners of power plants. Consequently, he said, nothing about the cost of electrical energy carried to the consumers' doors, but rested content with stating what could be done at the central station. Professor Burstall had added some useful information; and, in his remarks, he made the statement that, for ignition purposes, it was quite immaterial whether the ratio of air to gas was 3 to 1 with weak gas or 10 to 1 with strong gas. His (Mr. Humphrey's) own opinion was that the presence of an excess of oxygen was more favourable to ignition than an excess of merely inert gases. If they added to air a quantity of hydrogen, for instance, so that the heat units per cubic foot of mixture amounted to a definite quantity, and made another mixture with less air but more producer gas (which of course introduced carbonic acid and nitrogen), so that the mixture had again the same heat units per cubic foot, then he had strong reasons to think that the first mixture could be ignited more readily than the second. Concerning the remarks of Mr. Dixon, they clearly showed that he had not appreciated—indeed had quite failed to understand, the nature of the work which Dr. Mond had accomplished, and the importance of its success. He (Mr. Humphrey) spoke as a student of the past when he said that among the many who deserved to be remembered in the future for work done on the subject of power gas, two names would stand out with special lustre. One was that of Mr. Emerson Dowson, and the other that of Dr. Ludwig Mond. Mr. Dowson made it possible for a small gas-power plant to be worked more cheaply than a small steam-power plant; and his gas plants, using anthracite and coke, gave the impetus to the use of larger gas-engines than could have been economically used with lighting gas. Dr. Mond carried the manufacture of power gas into quite new regions when he was able to employ cheap bituminous slack for the purpose; and this, coupled with the recovery of bye-products in quantities previously thought impossible, advanced the question of fuel economy, and still more of fuel cost, well ahead of any point to which the best steam-engines could hope to attain, and rendered the system adaptable to the very largest as well as to comparatively small installations. Here, again, it was the Mond gas which made the demand for large gas-engines, just as was the case on the Continent where the use of blast-furnace gas created the demand for the large Cockerill, Otto, Deutz, and Oechelhaeuser engines. Mr. Dixon would do well to confine the term "producer gas" to its legitimate use. It was simply adding confusion to include blast-furnace gas in this term.

Time did not permit of further reply; but in regard to Mr. Dugald Clerk's criticisms at the last meeting, Mr. Humphrey has prepared the following for publication:—

Mr. Clerk, in his criticism, started out to show that the nature of the real advance made by Dr. Mond was different to the advance claimed. But nowhere can I find any mention as to what that difference is. Consequently I will dismiss the point. Now I should like to know what Mr. Clerk calls a good producer gas. Surely Mond gas having a calorific value of 150 British thermal units per cubic foot is a good gas; if not, where will Mr. Clerk find a better? Dr. Mond has therefore found the right conditions for making a good producer gas, and at the same time recovering the maximum quantity of ammonia; so that the two things cannot be altogether antagonistic as declared by Mr. Clerk. Mr. Clerk attacks the efficiency of the Mond producer, and refers, quite unnecessarily, to an earlier paper of mine, giving the extra fuel required for raising the steam added to the producer. Such figures are clearly stated in the present paper. But Mr. Clerk's treatment of the subject, whereby he makes the efficiency of the Mond producer appear as 67 per cent. is misleading for the following reasons: First, if he makes comparison with other producers which do not recover ammonia, he should take the corresponding case of the Mond plant working without recovery. Then less steam, and consequently less extra fuel, is required—the amount being less than the extra fuel used for the Dowson producer. Secondly, if he takes the case of the Mond plant working with ammonia recovery, he should convert the money value of the net resulting gain from the bye-products into its equivalent in slack, when he will find a substantial balance in hand above the extra slack used. On another matter I have to disagree with Mr. Clerk; for in considering the heat quantities, it is quite as fair to take heat from the exhaust gas of a gas-engine, and put it back into a producer as it is to utilize the hot-well water for the feed of a boiler, or to use the boiler flue-gases in an economizer. The comparison is between producers and gas-engines on the one hand, and steam-boilers and steam-engines on the other; and all possible economies should be added in the first case just as they are included in the second. It is so much the better for the gas plant that large economies are possible. Turning next to the volume of gas from a ton of coal, it is clear past all contradiction that, if the total carbon in the coal fed into the producer is known, and also the carbon lost in the ashes, dust, and tar determined, the balance must be the carbon in the gas. The accuracy of the method resolves itself into a question of the proper organization of the sampling and analyses, and the care with which the tests are made. Such a method would be difficult to apply to a short test. But when the experiment extends over long periods, as at Winnington, it becomes a reliable one; and I claim accuracy for the results, which are borne out by actual gas measurements at the small plant in Sandiacre. It is unfair to mix up the figures from different experiments, under different conditions, recorded in two different papers with a four years' interval between them; and before hazarding the absurd assumption that the efficiency of the Mond plant was only 50 per cent., it would have been better for Mr. Clerk to have pointed out any inaccuracy in my figures, or to have consulted someone like Professor Threlfall, who has spent a whole week at Winnington, and has taken the trouble to go fully into the matter. The objectionable part of Mr. Clerk's criticism is contained in his reflection upon the accuracy of my figures as the result of his own "rather careful study" of the subject. This so-called careful study, however, turns out to be characterized by false assumptions, and neglect to take important points into account. Professor William Robinson has been kind enough to go carefully through my figures, and has found them entirely consistent. Mr. Clerk is therefore at fault in his calculations regarding both the 50 per cent. efficiency and the lost hydrocarbons. Mr. Clerk is again wrong when he talks about the compression of the large Crossley engine being 60 lbs. The average for the two cylinders is much nearer 80 lbs. per square inch, as can at once be seen from the paper. Also his fairy-like tale about the engine being so beautifully adjusted as just not to pre-ignite, &c., all falls to the ground when I tell you that the engine was designed to give 100 lbs. compression and a corresponding higher horse power. Mr. Crossley has frankly told you one of the chief reasons why it did not do so. Mr. Clerk is behind the times when he says "no doubt the difficulties of water-jacketed pistons will be overcome." They were overcome three years ago. Finally, Mr. Clerk advises you to go slowly. You are to shut your eyes to the fact that the problem is solved, and hang back lest you should find yourselves abreast of your American cousins or ahead of your German friends, which would be, if not a catastrophe, at least something increasingly unusual. The three engines in the Winnington power-house are doing extremely well.

THEORY OF THE WATER-GAS PROCESS.

By Drs. H. STRACHE and R. JAHODA, of Vienna.

[Abstract Translation of Articles published in the "Journal fur Gasbeleuchtung" last year.]

SUMMARY.

The most interesting of the data used in the preparation of the diagrams (*ante*, pp. 275-6) are collected in the adjoining table.

The preceding calculations of the efficiency during the "run" refer to steam not superheated previously. The heat is, however, much more effectively utilized if the very considerable quantities of heat which can be stored up by the use of a regenerator are applied in pre-heating the steam. The cooling of the generator is decreased by the quantity of heat which the steam carries into the generator from the regenerator. As the temperature of the regenerator in many cases exceeds 1000° C. (1832° Fahr.), and the specific heat at this temperature is 0·783 per kilogramme, 1 cubic metre of steam carries with it 0·805 × 1000 × 0·783 = 632 calories [= 18 calories per cubic foot]. It is therefore clear that the heat utilized when a regenerator is employed is a considerable item.

It would take too much space at present to trace out the effect of the regenerator on the make of gas; but it must be pointed out that regenerators play an important part in the gasification of ordinary coal under Strache's process, as the coal is by it gasified by the superheated steam. The authors' theoretical researches could not cover the conditions of the gasificatlon of the coal because several other data which would be required for an adequate treatment of them, such as the heat of carbonization of coal and the heat of decomposition of tar and coal gas into carbon and hydrogen, have not yet been properly established. Their researches were therefore limited to the conditions prevailing when coke was used. In the gasification of coal, however, a certain quantity of heat must be continually conveyed from the generator to the regenerator, and stored up in the latter, owing to the formation of a producer gas, which, even though it is rich in carbonic acid, is combustible. Consequently, a higher temperature is always required in the generator than when coke is the fuel employed. It has been demonstrated already that heat may be stored up in a properly constructed regenerator without any considerable loss. If, however, coke is to be used exclusively in the generator, and the use of coal can be disregarded, then, on account of the simplicity and smaller capital cost of the plant, it is advantageous to forego regenerators. It has been shown in this communication that the apparatus without regenerators gives an efficiency of 70 to 75 per cent. The plant is made without regenerators, for the use of coke, and with them for the use of coal or lignite. In order to indicate that the theoretically determined efficiency agrees with the results obtainable in actual working, the figures below and on next page are given from a series of trials carried out with the water-gas plant at Pettau.

The data on the water-gas process, which have been determined by the authors with as great exactness as possible, lead to the following conclusions.

Rate of Flow of Steam.	Minute of Run at which the Observation was Made.	Temperature of Generator.	Temperature of Effluent Gas.	Undecomposed Steam. Percentage of Total.	Carbonic Acid. Per Cent.	Efficiency of Run. Per Cent. of Maximum.	Total Efficiency. Per Cent. of Maximum.
		°C.	°C.				
0·58	2	790	228	1·3	7·1	..	..
	5	788	207	2·7	4·6	69·0	54·5
	12	785	214	9·1	6·2	67·0	53·0
	20	778	221	21·8	8·9	60·5	47·0
	35	740	200	48·8	13·0	42·0	33·0
4·40	1	860	390	4·0	2·2	92·0	75·0
	3	850	390	10·0	2·7	91·0	74·0
	6	816	365	22·0	4·5	90·0	75·0
	9	810	365	24·0	6·6	88·0	73·5
	12	796	408	28·0	8·7	86·3	71·8
	16	775	415	45·5	11·4	83·5	71·0
7·50	1	..	530	...	2·7	..	..
	3	..	515	11·7	4·6	90·0	69·0
	6	..	490	27·4	9·6	88·0	70·5
	9	..	470	54·2	12·6	78·0	63·0
	12	..	470	62·1	15·6	73·0	59·0
8·10	1	..	515	..	3·4	..	..
	3	..	510	1·3	5·5	91·0	71·0
	6	..	500	19·7	11·2	88·0	70·0
	9	..	475	..	14·9	86·0	71·0
	12	..	470	47·9	17·3	82·0	68·0
13·00	1	..	470	7·6	3·4	92·0	73·5
	3	..	500	11·9	5·6	91·5	73·0
	6	..	500	32·1	9·0	92·0	71·5
13·40	1	900	470	14·3	5·0	91·5	72·5
	3	880	478	27·9	6·9	89·0	71·0
	6	830	475	48·9	9·4	84·0	67·5
	9	800	493	62·8	13·1	77·0	62·5
	12	780	492	69·6	13·9	74·0	60·0
17·00	1	..	600	8·1	2·6	91·0	69·0
	3	..	590	25·8	5·3	88·0	67·0
	6	..	560	48·5	11·8	81·0	62·0
	10	..	540	73·6	14·9	67·5	51·0
	12	..	530	76·5	15·2	65·0	51·0
21·20	1	945	680	8·6	4·4	90·5	70·5
	3	910	650	41·3	6·8	83·0	63·0
	6	865	620	48·6	8·7	81·0	61·5
	12	805	590	70·1	14·4	68·5	53·5
	16	780	..	77·6	17·6	61·5	47·0
21·30	1	..	680	..	2·0	..	..
	3	..	650	23·0	6·0	90·0	70·5
	6	..	620	63·3	11·8	72·5	54·0
	10	..	595	77·1	14·8	61·5	46·0

The object of the "blows" is to store up in the generator the greatest possible quantity of heat by means of the smallest possible consumption of fuel. Since the heat evolved is much greater

I.—*Experimental Data.*

Description and Analysis of Fuel.	Trial No.	Length of Trial.	Fuel Consumed.	Gas Made.	Make per Hour.	Pounds of Fuel Consumed per 1000 Cubic Feet of Gas Made.	Cubic Feet of Gas Made per Pound of Carbon Consumed.
		Hours.	Pounds.	Cub. Ft.	Cub. Ft.		
Gratz Gas Coke— (1) Per Cent. (2) Per Cent.							
Carbon . . . . . 88·00 .. 89·76							
Hydrogen . . . . . 0·64 .. 0·75							
Nitrogen and oxygen . . 2·02 .. 1·09	1	7·0	187½	7452	1065	25	44½
Sulphur . . . . . 0·48 .. 0·61	2	7·0	242½	8440	1206	28¾	39
Ash . . . . . 7·58 .. 7·46							
Water . . . . . 1·28 .. 0·34							
Calories per Pound.							
Calorific value . . . . 3302 .. 3384							
Per Cent.							
Upper Silesian Coal—							
Carbon . . . . . 63·57							
Hydrogen . . . . . 4·63							
Nitrogen . . . . . 0·88	3	7·0	280	6957	994	40	35½
Oxygen . . . . . 18·50	4	4·5	169¾	4768	1060	35½	40
Sulphur . . . . . 0·72	5	6·5	295½	7522	1157	39½	36½
Ash . . . . . 2·60	6	4·5	211½	6180	1373	34½	42
Water . . . . . 9·10	7	4·0	169	5580	1395	30½	47
Cal. per Pound.							
Calorific value 2622							
Per Cent.							
Yield of coke . . . . . 57·12							
Per Cent.							
Buchberg Lignite—							
Carbon . . . . . 41·6							
Hydrogen . . . . . 4·7							
Nitrogen . . . . . 0·6							
Oxygen . . . . . 25·1							
Sulphur . . . . . 0·3	8	5·0	475	7558	1512	63¾	30½
Ash . . . . . 8·1							
Water . . . . . 19·6							
Cal. per Pound.							
Calorific value 1677							
Per Cent.							
Yield of coke . . . . . 51·33							

II.—*Heat Balance.*

Fuel Used.	Trial No.	Calorific Value of the Fuel Consumed.	Calorific Value of the Gas Made.	Heat of the Exit Gases at 250° C.	Heat of the Water Gas at 600° C.	Percentages.			
						Calorific Value of the Gas.	Heat of the Exit Gases.	Heat of the Water Gas.	Ash Blown Over, Undecomposed Steam, and Heat Lost by Radiation.
		Calories.	Calories.	Calories.	Calories.				
Gratz Gas	1	626,960	528,000	60,400	39,200	84·2	9·6	6·2	..
Coke	2	811,360	598,000	53,100	44,500	73·7	6·5	5·5	14·3
Upper Silesian Coal.	3	734,200	493,000	77,200	36,600	67·1	10·5	4·9	17·5
	4	445,140	338,000	41,100	25,100	75·9	9·2	5·6	9·3
	5	774,650	532,000	67,700	39,700	68·7	8·7	5·1	17·5
	6	554,980	438,000	48,300	32,500	78·9	8·7	5·8	6·6
	7	445,140	395,000	41,100	29,400	88·7	9·2	6·6	..
Buchberg Lignite.	8	798,000	530,000	130,700	39,500	66·4	16·3	4·9	12·4

when carbon is burnt to carbonic acid than when it is burnt to carbonic oxide, and since at high temperatures the incandescent carbon reduces carbonic acid to carbonic oxide, thereby expending heat, it clearly is advantageous to maintain the conditions which afford as complete combustion to carbonic acid as is attainable. This becomes possible only so far as the proper temperature can be maintained. Any other method proposed for attaining the same object must eventually depend upon the temperature. As the temperature rises, the percentage of carbonic acid in the producer gas diminishes. It is possible, therefore, either to work exactly in accordance with the temperature, or, as is simpler to do in practice, according to time. It is certainly established that both the velocity of the air blast and the depth of the bed of fuel have no effect on the percentage of carbonic acid in the producer gas, or on the efficiency. Both the carbonic acid and the efficiency are merely functions of the temperature of the generator or of the heat stored up in it.

The chief source of loss of heat during the blows is (apart from the formation of carbonic oxide), in the escape of the producer gas at a high temperature. If, therefore, this gas, before passing to the flue, traverses a regenerator, in which the carbonic oxide formed is burnt by means of secondary air, the greater part of the heat which would otherwise be lost is again made available. Thus it is possible to keep the efficiency constant throughout a long blow, though, so far as the generator alone is concerned, it falls off rapidly. The application of a regenerator consequently admits of blowing until high temperatures are attained in the generator, without appreciable loss of heat ensuing. The heat stored up in the regenerator is again made available by superheating steam which is passed through it. The steam serves, when coal or lignite is used, to convert them into coke, for which purpose it must necessarily be highly superheated.

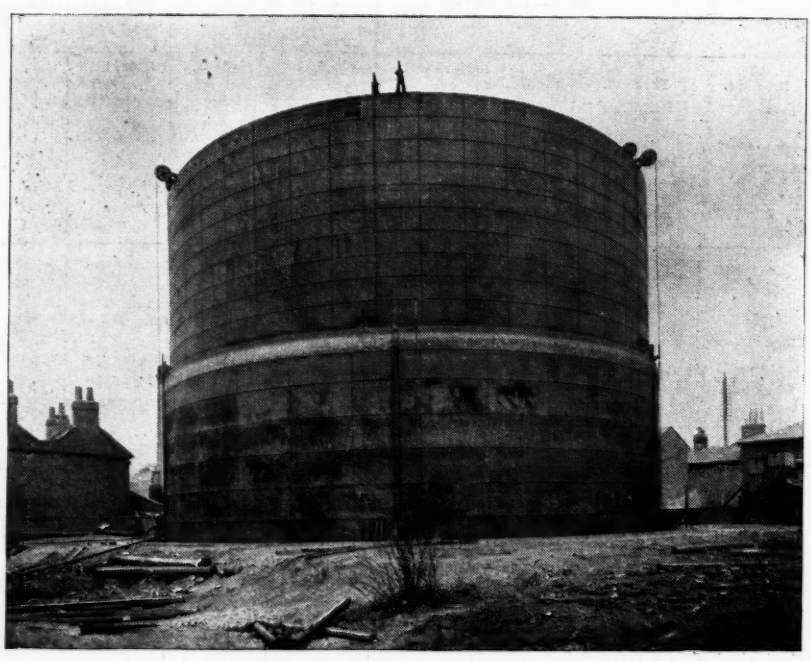
The following are the more important facts as to the "runs." At any particular temperature of the generator, the quantities of carbonic acid and of undecomposed steam increase with the rate of flow of the steam. With a constant rate of flow, and an increasing temperature, the carbonic acid and undecomposed steam diminish. Finally, the carbonic acid and undecomposed steam can be reduced to a minimum, even at low temperatures, by diminishing the rate of flow. The carbonic acid and undecomposed steam rise and fall in unison. The rate of flow of the steam is of supreme importance for the efficiency of the "runs," as the undecomposed steam, on account of its high specific heat, carries off a great deal of heat from the generator, especially if that vessel is at a high temperature. Having regard to the radiation from the generator at any temperature, it appeared that there was a particular rate of flow of the steam with which the maximum efficiency was attainable. This maximum ranged from 87 to 93 per cent.

The total efficiency depends on the carbon consumed during both runs and blows, and is expressed as a percentage of the heat of combustion of the water gas made. The total efficiency is chiefly dependent on the efficiency during the runs, or on the temperature of the generator and the rate of flow of the steam. It follows, on the other hand, that the efficiency of the "blows" at the temperatures concerned is quite without effect. It only comes into account (unfavourably) when very high temperatures are employed. The total efficiency is at a maximum with a particular rate of flow of steam. With that rate of flow, a total efficiency of 77 per cent. is attainable at 860° C.

This communication shows, therefore, that the rate of flow of the steam is, in addition to the temperature, of the utmost importance in the water-gas process, in regard to both the make and the quality (*i.e.*, freedom from carbonic acid) of the gas produced.

RESTORATION OF THE BARKING GASHOLDER.

It will be as much a pleasure to the majority of our readers to receive, as it is our pleasure to give, some information regarding what has been done in connection with the collapse of the Barking cable-guided holder since the unfortunate occurrence of the 18th of October last—the experiences of the evening of which day will long live in the memories of the Company's officials (Mr. W. B. Reidie in particular) and those who willingly rendered valuable assistance in this grave misfortune. We are still in ignorance as to the cause of the accident. Opinions on the point are, we



The Barking Holder as Reinstated.

believe, divided; but we would again ask readers to withhold condemnation of the cable-guided system as such until the matter is completely sifted, and the truth arrived at, as no doubt it will be in due season. Information gathered at the time, and bearing on the matter, cannot yet become public property. When it can, we hope readers will find that the explanation will satisfy all questions on the subject.

The photographic reproduction which we publish shows that the holder has been completely re-established, and the Contractors (Messrs. Ashmore, Benson, Pease, and Co., Limited) are to be complimented on the adroit and speedy manner in which they succeeded in reinstating the structure, whose forlorn condition a few days after the accident gave one the impression that many weeks would pass before it could be put into a serviceable state again. But on receiving instructions from the Gas Company, the firm went about the work with celerity. Their superintendent examined the damage on Oct. 26, and found that, so far as was then ascertainable, the outer lift was resting with its bottom curb on the top of the tank on the south side, and the inner lift down on the rest-stones. This lift was raised by screws, and suspended above the tank top; and it was discovered that three of the tank top carriages were missing (having fallen into the tank) and one pulley was broken. Several of the sheets were found to be buckled, and required cutting out and replacing. The bottom curb was also found to be bent, and two bottom carriages broken. The internal channel-guides were also bent in one or two places, and had to be taken off, straightened, and refixed. Before the inner lift could be examined, the water had to be cleared from the tank. This was accomplished by about the 6th of November, when it was found that the cup of the inner lift for a distance of about 20 feet had turned under; but, with this exception, and one or two damaged pulleys, there did not appear to be much the matter with the lift. The cup was cut out at the injured part, and a new piece inserted, with new sheets adjoining. The necessary new parts were made at the works of Messrs, Ashmore, Benson, Pease, and Co.; and they had the tank filled with fresh water and the holder started again by Nov. 26, or within twenty days from the time the water was got out, and in less than one month from the day they took the work in hand. The operations were carried out on both lifts at the same time to facilitate completion. There was, of course, a large amount of detail work to do in reinstating the holder which it is rather difficult to particularize, but the foregoing gives a sufficient idea of the nature of the principal work which had to be undertaken in order to bring the holder to its former useful state.

District Gas Associations.—The annual meeting of the Midland Association of Gas Managers is to be held in Birmingham on the 21st inst. We are asked by the Hon. Secretary of the Manchester District Institution (Mr. S. S. Mellor, of Northwich) to notify that the annual meeting will not be held on the 23rd inst., but on Saturday, the 2nd prox.

Bacteria in Water.—In the course of a lecture on the "Effects of Physical Agents on Bacterial Life," delivered at the Royal Institution by Dr. Allan Macfadyen, Director of the Jenner Institute of Preventive Medicine, he stated that the physical conditions favouring the presence and multiplication of bacteria in water under natural conditions are a low altitude, warmth, abundance of organic matter, and a sluggish or stagnant condition of the water. As regards water-borne infectious diseases, like typhoid or cholera, their transmission to man by water may be excluded by simple boiling or by adequate filtration.

Cost of Private Bills and Orders.—A parliamentary paper issued last week furnishes particulars, moved for by Mr. D. A. Thomas, of expenses incurred each year, from 1892 to 1898, in promoting and opposing Private Bills and Provisional Orders. For the former purpose £3,348,635, and for the latter £1,148,199, were expended. In connection with the supply of gas, £118,681 was spent by companies in promoting, and £25,430 in opposing Bills —together, £144,111. In respect of water supply the figures were £213,925 and £61,487—together, £275,412; and of electric lighting, £17,169 and £7558, or a total of £24,727. On Gas Provisional Orders the expenditure was £19,872—£17,964 in promotion and £1908 in opposition; on Water Orders, £10,546 (£9349 and £1197); and on Electric Lighting Orders, £39,403 (£36,933 and £2470). A list is given of the companies who did not make returns.

The Subway Question.—In the course of his address to the Society of Engineers on Monday last week, the new President (Mr. Charles Mason) alluded to the practice of a municipal engineer, with special reference to work in large towns, including the repair and maintenance of sewers and pavements, and the construction of subways for accommodating the numerous pipes and wires laid beneath the street surfaces. He expressed surprise that more headway had not been made with regard to the general adoption of a scheme of subways for London; the few now existing being, he said, frequently too small for the purposes they were intended to serve. An ideal subway was described, by which the entire width of the street should be occupied; and he observed that, though the cost and difficulties of construction would be great, if some scheme of rental, based upon the present expenses incurred in continually opening and making good the street surfaces, were arrived at, and devoted to payment of interest on capital, a good return would, in his opinion, result.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by correspondents.*]

Gas-Fires.

SIR,—Twenty-five years ago I built for myself a house in which gas as a labour-saving agent was specially considered. What the extra cost was, I could not tell; but I do not think it added anything like 10 per cent. to the total. This house I lived in for fourteen years. The fire-places in all the rooms (12), except the kitchen, were in duplicate—taking either coal or gas fires; and when we left the house, most, if not all, the flues were as clean and free from soot as the day they were built. The kitchen fire was excluded for two very good reasons —the wastefulness of the average servant as regards gas, and the possible failure of the gas supply for cooking. The latter we found useful either three or four times during the fourteen years; and except these, it was never used for cooking. A back-boiler and circulating pipes were put in for the bath and hot-water service; but they were never used, nor were they used by the tenant who occupied the house for five years afterwards.

We estimated that the saving of labour was equal to one good servant; and this saving nearly paid the entire gas bill.

During the whole time almost every new departure was tested in actual work; and that we made a good beginning is amply proved by the fact that, after twenty-five years, many of the original applications are now in daily use—having proved themselves capable of filling our requirements perfectly.

That my estimate of the total number of gas-fires made and sold during the last twelve months cannot be far from correct, I am certain; and when everything is considered, I fail to see any reason for the dismal tone of the average correspondence now appearing. That matters will improve there is no doubt; but it is a question of time.

THOS. FLETCHER.

Warrington, Feb. 6, 1901.

SIR,—May not a considerable amount of the prejudice against gas-fires be attributed to the reckless statements made by representatives of gas companies as to the amount of gas consumed by them, when advising customers to adopt them, and also to the neglect to give instructions as to their proper management?

A. CLARKE.

Stoke Newington, Feb. 8, 1901.

SIR,—In response to your invitation to have the views of gas-stove manufacturers on gas-fires, I venture to submit that gas-fires are not used more generally because gas companies do not usually hire them out, nor sufficiently encourage their sale either for cash or upon deferred payment.

That the patterns at present in use are successful can be best proved by the large numbers hired out by the London and various enterprising Provincial gas companies, who have not been afraid to undertake this branch of the fuel business, although I freely admit that the patterns on the market have had too much casting and too little fire. It has been a case of "much tablecloth and little meat." The tendency, however, is now for makers to reduce the castings, and open out the gas-fire proper, which is undoubtedly a great step in the right direction.

A gas "log," as referred to by your American Correspondent last week, fitted in a red tiled recess, is, to my mind, the most pleasing gas-fire yet made; but then this, in common with the expensive patterns Mr. Fletcher referred to, costs too much for general adoption. This question of a tiled recess really has a great deal to do with the whole problem, especially from the stand-point of the builder and architect, as per your interesting leader on p. 323 of the Feb. 5 issue. No one would believe, until he had tried it, the immense improvement in the appearance of a gas-fire when set back in a tiled recess. Present arrangements generally consist in putting the gas-fire in front of the fire-place, and filling up the front of the grate with a piece of sheet iron—a makeshift plan which accounts for much of the unsightliness complained of. In some towns—Leicester, for instance—arrangements are frequently made by the architects for recesses in the scullery or kitchen, in which a gas cooking-stove can be placed; but very few houses are built with tiled recesses in the living-rooms, in which a dog coal-grate or a gas-fire might be put with advantage. Why do not gas companies circularize the builders and architects in each town, pointing out the desirability of providing tiled recesses, and follow it up with personal interviews? When large building schemes are in hand, such alterations might, with judicious persuasion, be inserted in the plans. This, however, refers more to the future. We have now to deal with the present, and the existing grates. We are, therefore, face to face with the public wanting something cheap. This they get from their gas company or ironmonger; and frequently the latter sell that terribly extravagant arrangement, "a gas-fire burner to fit in the existing grate," which wastes both the heat and the consumer's money, and which we warn the consumer against in every fire list we publish.

The advantage accruing to a gas company hiring fires is manifest. A better-class fire will be rented, and economy is effected. Take, for instance, the South Metropolitan Gas Company's system, which I have advocated far and wide—a basis of about 15 per cent. annual rental on the net cost of the fire, payable in two instalments at Christmas and Lady-day; no charge being made for the summer quarters. This works out as follows: Take a good-class fire, costing net (say) £2. It is rented at 6s. per annum. What consumer will now adopt the popular priced gas-fire at 21s., if he is offered a better-class fire of proved economy at 6s. per annum? The experience of many towns, of which I will name but one—viz., Belfast—has proved the foregoing to the hilt; and the Gas Department there have far more gas-fires out on hire than cookers. The over-caution and conservatism of many gas departments in this connection is gradually, but far too slowly, giving way. Take, for example, a shop consumer abandoning gas for electric light. Surely here is a case where gas might be largely used for heating; but not if the stoves are to be bought. The consumer

says: "You want me to use your gas. Very well, provide me, on reasonable terms, with the means to burn it."

You ask, Sir, for information as to what class of stove we mostly sell. 1.—To gas companies, who hire, we chiefly supply economical gas-fires, averaging from £2 to £3, white-light stoves costing from 15s. to 40s., and condensing stoves costing about £6. 2.—To gas companies and ironmongers who sell, we chiefly supply white-light stoves averaging about 15s. to 25s. (which are invariably economical), cheap gas-fires averaging about 9s. to 20s. net (which are not economical), and gas-fire burners averaging about 4s. net (which are wasteful). The largest volume of trade is in the second portion, and confirms my statement that gas companies are themselves to blame for not more generally hiring out, on prudent terms, the better-class article. There has during the last two or three years sprung up a considerable trade in large cast-iron condensing stoves, which gas companies are beginning to hire. Let us hope they will, for their own sakes, develop the whole field on similar lines.

Our experience at Dublin and Bournemouth is that, by altering the rentals from quarterly to half-yearly, payable, as stated, at Christmas and Lady-day, we have reduced our returns to a very low percentage; and I believe it is the fear of summer returns which has prevented many gas companies hiring fires.

I trust this information may lead some few engineers to adopt fires, as well as cookers, on the rental basis.

E. W. T. RICHMOND.

132, *Queen Victoria Street, E.C., Feb.* 8, 1901.

P.S.—Since writing the above, I have obtained the following figures:—

	Ordinary Consumers.		Proportion of Hired Fires as Compared with Hired Cookers.
	Cookers.	Fires.	
The South Metropolitan Gas Company had on hire to Dec. 31, 1900.	50,756	12,067	say 1 fire to 4 cookers.
Brentford Gas Company . .	7,196	2,133	,, 1 ,, ,, 3½ ,,
West Ham Gas Company .	4,000	700	,, 1 ,, ,, 5½ ,,
Dublin Gas Company . .	1,700	1,200	,, 1 ,, ,, 1⅓ ,,
Bournemouth Gas Company	1,400	760	,, 1 ,, ,, 2 ,,

We have only to point out that there are (say) five rooms in a house, against one kitchen, to show what a field even these and other hiring companies have. How much more those who have not yet hired? The annual percentages of Dublin stoves returned from hire, are: Cookers 8 per cent., fires 11½ per cent. I have not obtained the figures of returned fires from the other Companies; but I presume they are similar. It will be noted what a large percentage of fires are out at Bournemouth and Dublin, chiefly as a result of canvassing.—E.W.T.R.

The Gaslight and Coke Company.

SIR,—Of late years, I have frequently noticed what I would call "railing" against the Gaslight and Coke Company—known years ago as the "Chartered Company"—on account of the amount of its capital relative to its business, compared with the same items in other London Gas Companies. Last week's "JOURNAL," on pages 340-41, gives the latest instance.

I have thought that those who so write do not know the history of the London Gas Companies, as those who have lived in London for the last forty years do. The Chartered Company was the first to light London with gas. Within my memory, it had three gas-works—one at Brick Lane, one at Curtain Road, and one at Westminster. All these have been abolished for many years. Subsequently it had the Equitable (I think) and the City of London works at Blackfriars Bridge—both on the Thames. These have been abolished for a less number of years (but abolished certainly), all of which has been a benefit to London, and, no doubt, a loss to the Gaslight and Coke Company, for it has erected other works several miles from town at great expense even for leading mains.

I do not think I need say more, for there is no other Company supplying the Metropolis which has passed through such vicissitudes as tend to increase capital in proportion to business done.

GEORGE ANDERSON.

35A, *Great George Street, S.W., Feb.* 8, 1901.

Mr. Dibdin's Paper on Coal Gas.—A correspondent points out that the price-equivalents for Sugg's table-top No. 5 burner, given in the concluding portion of the article on the above subject which appeared last week, do not agree with the diagrams accompanying the paper published in the December number of the "Journal of the Society of Chemical Industry." Widnes, 3s. 9d. for 12·2-candle gas, is correct; but South Metropolitan should be 3s. 4d. (not 3s. 10d.) for 12·5-candle gas, and Gaslight and Coke 6s. 1½d. (not 7s. 3d.) for 12-candle gas. Our correspondent says: "I quite agree that the comparisons are valueless, but only plead for accuracy in quotation, even of errors."

Leicester Gas Supply.—The Leicester Corporation Gas Committee report that 81,759 tons of coal were carbonized during the six months ending Dec. 31. The quantity of gas made was 868,516,000 cubic feet—an increase of 33,697,000 cubic feet, or 4·03 per cent., on the quantity made in the corresponding period of the previous year. Considerable progress has been made with the installation of the carburetted water-gas plant, which it is expected will be ready for action about the middle of the year.

The Penny-in-the-Slot Meter Experiment at Loughborough.—At last week's meeting of the Loughborough Town Council, the Gas Committee reported that the Manager (Mr. E. Onions) had, in pursuance of the instructions of the Committee, caused fifty 3-light penny-in-the-slot meters, with cooking-stoves, to be fixed in the town. He had presented particulars as to the cost, consumption of gas, and amounts collected from the meters to date—indicating that the experiment so far had been completely successful. He held 34 more applications for meters. It was resolved to authorize the purchase and issue of 56 more meters similar to those already obtained.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Monday, Feb. 4.

(*Before Justices* WILLS *and* CHANNELL.)

Andrews v. Witts and Another—The Use of Domestic Water for Trade Purposes.

This was an appeal against a dismissal by the Gloucester Justices, at Thornbury, of an information under the Water-Works Clauses Act, 1863.* The question arose on section 18 of the Act with regard to a supply of water which the appellants, the West Gloucestershire Water Company, were making to the town of Thornbury, under an agreement with the Urban District Council.

Mr. H. E. DUKE, K.C., M.P., who, with Mr. METCALFE, appeared for the appellants, said that, under agreement, the West Gloucestershire Water Company supplied the people of Thornbury with water by means of stand-pipes in the town; and the question was whether this water was provided by the Company or by the Urban District Council. There had been what was unquestionably a misuse of it, if the water was supplied by the Company. The use to which it might be put by the householders was limited to domestic purposes, washing carts, and extinguishing fires; and the offence charged upon the information was that the defendants had taken it for trade purposes, and claimed a right to do so. The case stated by the Justices for the opinion of the High Court set out that at a Petty Sessions held at Thornbury on Aug. 1, 1900, an information was laid by Samuel Frederick Andrews, the Secretary and Manager of the Company, against the two respondents, George Witts and another, charging that they, on July 16, 1900, did use this water for a purpose other than that for which it was supplied, and that the second defendant, who was in the employ of Witts, used it for trade purposes contrary to the provisions of the Act. The facts were that by an agreement dated Sept. 16, 1898, made between the Thornbury Rural District Council and the Water Company, certain mains and stand-pipes, the property of the District Council, were demised to the Company for thirty years, at a nominal rental of 1s. a year; and in consideration of such demise, at a certain rental, the Company covenanted to supply the various mains and stand-pipes with sufficient water for domestic purposes, for washing carts, and for use in case of fire. The respondents were both ratepayers—the defendant Witts carrying on business as a baker—and it was admitted that he took the water for baking purposes, and intended to continue doing so. It was contended that the respondents were not the proper persons to be proceeded against, as they paid the District Council for the water, and did not pay, and had no agreement with, the Company, nor did they get the water from them. On the other hand, it was argued that, as the water had been drawn and used for an improper purpose, and not according to agreement, the property in it still belonged to the Company, and had not passed to the District Council, and that therefore the defendants were liable for improperly using it. The question for the Court was whether the Justices were right in dismissing the information. The short point was whether the water, which these persons undoubtedly obtained from somebody, was a supply which they had from the Company. Section 18 of the Act specified that "if any person, having from the undertakers a supply of water for any other than domestic purposes, uses, for any purposes other than those for which he is entitled to use the same, any water supplied to him by the undertakers, he shall, for every such offence, be liable to a penalty not exceeding 40s., without prejudice to the right of the undertakers to recover from him the value of the water misused." The real question was whether the master here had the water from the "undertakers;" and the short answer to it was that the Company were the only people who could supply water, though it was true the water was brought to the place by agreement. But by section 51 of the Public Health Act, 1875, the District Council had power to supply water within their district, or to contract with any person for such supply. Under these circumstances, he submitted that the respondents must be convicted.

There was no opposition to the appeal.

Their LORDSHIPS held that an offence had clearly been committed, that the Justices were wrong in law, and that the case must go back to them with directions to convict accordingly.

The appeal was therefore allowed.

WESTMINSTER COUNTY COURT.—Wednesday, Feb. 6.

(*Before His Honour Judge* LUMLEY-SMITH, K.C.)

West Surrey Water Company v. Silly.

In this case, the plaintiffs claimed £6 arrears of water-rate in respect of four cottages in George Lane, Hersham; and the point raised was whether or not the owners of the premises were liable. The facts of the case were somewhat unusual. The defendants are trustees under an old will of one George Silly, and they are also named as executors of the will of Charles Silly, who was permitted to receive the rents of the premises; but as he had nothing to leave, the will was not proved.

Mr. C. R. SIMPSON appeared for the plaintiffs; Mr. RUSTON represented the defendants.

Mr. SIMPSON said the claim was made under section 72 of the Water-Works Clauses Act, 1847, which made the owners of premises of not exceeding £10 a year rental liable for water supplied thereto. The Water Companies (Regulation of Powers) Act, 1887, made the water-rate a charge upon the premises, and the owner for the time being was liable. The Company had charged 10s. a year for each house, which was let at 4s. 6d. a week.

His HONOUR remarked that this would be £11 14s. a year, which would exceed the amount named in the section quoted.

* See "JOURNAL," Vol. LXXVI., p. 360.

Mr. RUSTON remarked that consent in writing was needed, and the rents were 5s. 6d. a week.

Mr. SIMPSON said the Act meant "annual value" not rack-rent.

Mr. RUSTON: Consent in writing is needed under section 44 of the Act of 1847.

Mr. SIMPSON replied that this was not so where the local authority required a supply of water to be put on, as was done in this case.

The Rate Collector was then called, and said the present assessment was £9 gross, and £6 15s. net. In cross-examination, he admitted that he did not know the rents were 5s. 6d. a week, the tenants paying the water-rates.

Mr. *Percy Webb*, Clerk to the Walton-on-Thames Urban District Council, proved the service of, and non-compliance with, the notice to put on a supply of water. He said the Council then did the work. This was in 1897. There was a well on one of the premises (he was not aware that there were two), and the analyses of the water showed that it was bad.

Mr. *J. K. Hill*, the plaintiffs' Engineer, deposed that a main was laid to the cottages under the direction of the District Council, and that the wells were not closed.

Mr. *Cecil A. Webb*, the Company's collector, deposed that in July, 1898, an action was brought against Charles Silly. An execution was issued, but nothing was recovered. The defendant did not appear, and the value of the property was never disputed.

His HONOUR asked whether, seeing that judgment had been recovered for £2 against Silly, the Company could now sue someone else.

Mr. SIMPSON replied that, as the judgment had not been recovered, they could sue once more.

His HONOUR did not think they could get judgment over again.

Mr. RUSTON said, if the Company claimed at all, they could only charge 2d. a week for each cottage, which would come to £1 14s. 8d. a year; and they now asked for £2 each per annum. An order had been made in the Chancery Court for the sale of the property, and the Solicitors for the Company brought this matter before the Master, who was not satisfied.

His HONOUR thought it was clear the value was less than £10 a year. If he made a charge upon the property, no doubt it would be paid. He would therefore make that order.

Mr. RUSTON said if the Master had been told there was an order of the District Council, he would have made the charge.

His HONOUR said he was of opinion that he could only make a charge for the water-rate and interest. There would be an order for the law costs only as against the defendants personally.

THAMES POLICE COURT.—Wednesday, Feb. 6.

(*Before Mr.* FREDERICK MEAD.)

The Right of the Commercial Gas Company to Increase the Price of Gas for Public Lighting.

In the "JOURNAL" for the 29th ult., a paragraph appeared briefly reporting the facts in a case which had been before the Court on two occasions, and in which the Commercial Gas Company summoned the Mayor, Aldermen, and Councillors of the Borough of Stepney for £917 8s. in respect of gas supplied—this being the amount due for gas delivered for public lighting during the Lady Day quarter calculated at the increased price. The sum and substance of the case was that the Council challenged the Company's right to raise the price of gas supplied for public lighting without adequate notice; but the Magistrate's decision really places them in a better position than that for which they contended. As will be seen, however, the matter is to be further contested.

Mr. G. A. YOUNG appeared for the Company; Mr. BIRCHALL, the Deputy Clerk for the Borough of Stepney, represented the Council.

In the course of the first hearings, Mr. Young stated that the proceedings were taken under the Commercial Gas Company's Act of 1875, section 53, which allowed the Company to raise the price of gas if the rate of dividend was reduced. He maintained that no notice to defendants of increase in price was necessary. Mr. Birchall admitted the amount claimed, provided that no notice of increased price was necessary. Defendants paid less than private consumers; and when the Company had previously raised the price to the latter, the parish price was not increased. He argued there was practically a quarterly agreement between the Company and defendants; and therefore his clients were entitled to notice, and alteration could not be made in the currency of a quarter. Even if it could, notice should be given. The price last arranged was £3 16s. in respect of each lamp, including the charge for gas, painting, maintaining lamps, lighting, and extinguishing them. Mr. H. D. Ellis, the Secretary of the Company, was called, and stated that the price had been twice raised to private consumers in 21 years, in conformity with the statutes; but on those occasions it was not increased to the public authorities. At the close of considerable argument, at the hearing on the 23rd ult., his Worship intimated it was his opinion that if the Company wanted to raise the price, then they ought to have given the Local Authority reasonable notice to put an end to the existing agreement. All the sections quoted, when taken together, pointed to a special agreement as to the remuneration of the Company by the local authorities. Mr. Young again submitted that his clients were entitled to raise the price 6d. per 1000 cubic feet without notice. At this stage, his Worship adjourned the proceedings for the production of certain statements.

We are enabled to give a longer account of the proceedings at the conclusion of the hearing last Wednesday; and from the report a better idea of the line of argument will be gained.

His WORSHIP inquired whether the parties had settled between them the amount that would be payable under the old reckoning.

Mr. YOUNG said he had had a calculation made (which he thought his Worship also wanted) as to the rises and decreases in price to the public and private consumers.

Mr. BIRCHALL remarked that they had not agreed, as the figures were not necessary to the question.

His WORSHIP observed there was one other matter with regard to costs. He had been considering that there was no tender made by the Local Authority.

Mr. BIRCHALL said there had been. On Aug. 9, £797 17s. 9d. was tendered, since which the Authority had paid a sum in respect of repairs, which reduced their present indebtedness, according to their view of the matter, to £792 13s. 7d.

Mr. YOUNG: The amount was tendered was it not at the old rate by the Board?

Mr. *H. D. Ellis*: At the old rate.

His WORSHIP said his difficulty was whether he could give the defendants costs, because really they were the unsuccessful litigants. He was going to find for the Gas Company for a certain amount; and they had lost, and the defendants had saved, the interest on the £700 odd. Therefore, with regard to costs, the parties might as well cry quits. The defendants had had the use of the money; and he could not give the Company interest. If the parties would agree as to the figures, he would make the order.

Mr. YOUNG: Have you made up your mind, Sir, with regard to the decision? I though it was left open.

His WORSHIP: I have, if there is no fresh light to be thrown upon it by you.

Mr. YOUNG said he should like to make a few remarks. The first point (as he understood it) that was made was that the price amounted to a matter of contract. If that was so, it applied equally well to the private consumer—it must be a contract either expressed or implied. The Metropolis Gas Act of 1860 had been referred to in connection with the contention as to the price being a matter of contract. Section 22 provided that the Company should, if required by the Local Authority, supply so much gas as was required for the public lamps. Reference was made in the section to a contract, but certainly not to one as to price. The contract might have reference to the distance the lamps were from each other, as referred to in section 22, or it might have reference to matters alluded to in section 23 as to the repair of lamps, and as to the lighting and extinguishing of the gas. Then it was said that section 53 of the Commercial Gas Company's Act of 1875 did not apply in the case of a local authority. The section stated—

> The standard price to be charged by the Commercial Company for gas supplied by them shall be 3s. 9d. per 1000 cubic feet, provided that the Company may increase or diminish such standard price, subject to a decrease or increase in the standard rates of dividend as defined by this Act.

In this section no distinction was made at all between private consumers and local authorities. He submitted there was nothing in the implied contract between the parties which had the effect of depriving the Company of their right under section 53. Then it was urged that it did not apply because there was no supply by meter. But he submitted that virtually this was a supply of gas by meter, for this reason: That a calculation had been made as to the number of hours the gas was to be consumed, and as to the number of cubic feet that were to be consumed during those hours—viz., 21,500 cubic feet per annum. That was the amount that had been agreed upon for years between the Local Authority and the Company; and the price, of course, was based upon that consumption. The Authority paid so much per 1000 cubic feet on the 21,500 cubic feet. Therefore, he submitted this was an implied contract by the Local Authority that they would pay for 21,500 cubic feet per annum—of course, at the price the Company were entitled to charge. They knew the Company were entitled to an increase or decrease of price, and that, though the consumption was a fixed quantity, the price was a fluctuating one. They knew the price varied; and they knew they might be liable to pay either more or less. The rest of the amount was made up of fixed prices for certain services rendered by the Company. No change was made in this respect; and, in fact, the Company would have no right to make a change under this head without reasonable notice. The only increase was between 2s. 2d. and 2s. 8d. per 1000 cubic feet. Therefore, he submitted this was virtually a supply by meter; and the implied contract was subject to section 53 of the Act—if the rate was increased, then, of course, it was subject to the natural condition, that there should be a reduction of the rate of dividend, which was the case. It was admitted by the Authority that, if notice was unnecessary, the Company were entitled to claim the amount on this summons. It was further argued by the Local Authority that the Company had no right to charge them an increased price, because on two occasions when the Company had raised the price to the private consumers, they had not done so to the Local Authority. He certainly contended they could have done so had they chosen. If the price was decreased, the Local Authority had the right to say, "You are bound to allow us the reduced price;" and, on the other hand, if the price was increased, the Company had the right to say, "You are liable to pay this increase." He held that the Company had done nothing to give up their rights. Had they chosen, they could have increased the price on these two occasions as against the Local Authority; but because they were magnanimous enough not to increase the price then as against the Local Authorities, it did not bar them for ever and ever from their rights under the section. His point was that, if section 53 did apply, no notice of increase was necessary.

His WORSHIP: My present view of that is it would not be. It would be really *obiter dictum*.

Mr. YOUNG (proceeding) said it was also contended that the contract was a yearly one. If it was, he submitted it was subject to section 53—to the right of the Company to increase the price at any time. The Local Authority had taken advantage of decreases; and so it was perfectly clear in regard to decreases that the Company were entitled to change the price. In the same way, they were entitled to increases. Therefore, if this was to be regarded as a yearly contract, it must be regarded as such subject to their rights under section 53. The question was whether this was a yearly contract.

His WORSHIP: It seems to me to be a yearly contract to be automatically renewed; and therefore, if either party does not want it renewed, they must give reasonable notice to cease at Dec. 31.

Mr. YOUNG said that last year the Whitechapel Board of Works wrote to say that they had the electric light, and that therefore they would not, in about a month's time, want the Company to supply light

in different districts. The Company did not write and say that was not sufficient notice.

His WORSHIP: That was a question for them.

Mr. YOUNG said that he had stated the view the Company had taken. But really it did not matter whether this was a yearly contract or not, as he maintained, whether it was or not, it was subject to section 53, under which the Company were entitled to make an extra charge.

His WORSHIP: The Local Authority are rather prejudiced by making a tender for the whole amount for last quarter.

Mr. YOUNG: For the Michaelmas Quarter.

His WORSHIP: I do not know how that will affect them if they chose to dispute it.

Mr. YOUNG (continuing) said section 69 had been referred to as showing that section 53 did not apply. Section 69 provided that the Company should not charge a higher price per 1000 cubic feet for gas supplied to the Local Authority than the lowest price charged to any private consumer. This did not get them out of section 53 at all. Its effect was that the Local Authority stood in a most favourable position, in that the Company could not charge a private consumer less than a Local Authority, with this exception: "If there are special circumstances justifying them in charging a lower price to any other customer, the question whether or not such lower price shall be taken as the standard for the price to be charged to the Local Authority shall be determined by arbitration, and the price fixed by such arbitration shall continue for two years at least."

His WORSHIP: If section 53 does apply, what is the use of section 69? It would not be wanted.

Mr. YOUNG said it prevented the Company charging the Local Authority a higher price than any ordinary consumer, unless they could show special circumstances to exist. Clearly by this section it was assumed they were entitled to change the price, because it was only in a case where there had been an arbitration that the price was fixed, and then it continued for two years at least. It went to show in either case that the price was a varying one; and therefore this was an argument in favour of his contention that the Company were entitled to section 53 as against the Local Authority. References were next made by Mr. Young to section 71 (which dealt with the pressure of gas) and to section 84 (which made provision regarding the method of measuring the gas supplied to the public lamps if required by either party); but, he said, neither question arose in this case. In conclusion, he submitted that section 53 was the governing one.

His WORSHIP said he adhered to the opinion expressed on the former occasion. There were three points against the Gas Company. One was that on previous occasions they had refrained from raising the price of gas to the local authorities when they had raised it to the private consumers. At the time when there was this increase, and at the time the increase was made, in effect, the Company were charging the Local Authorities on a different scale to what they charged the private consumer; and the correspondence showed there were not these automatic increases or decreases in price, but it was on the application of the Local Authorities that the Company decided to make a reduction on some occasions to the Local Authorities in question. He should be perfectly willing to state a case if applied for in the ordinary way.

Mr. BIRCHALL: Will you say what you consider reasonable notice?

His WORSHIP: No; I do not think I am called upon to do that. I decide that section 53 has nothing whatever to do with it. The contract is still pending—the contract that was commenced at the beginning of the year; and the price is subject to that contract until the end of the year.

Mr. BIRCHALL: The price is subject to the contract existing at the beginning of the year?

His WORSHIP: Yes.

Mr. YOUNG: Would you like to have the amounts, supposing it is decided eventually that the Company are entitled to the increased rate, but only from the 6th of April.

His WORSHIP: If I am wrong, the matter will be sent down to me; but if you make a point of the two dates, I can include them in the case.

Mr. BIRCHALL: There are some undisputed payments; but I understood you to rule that the contract stood good at the time the Company raised the price of gas?

His WORSHIP: That is so.

After a conference between the legal representatives and Mr. Ellis, the amount payable for the quarter in question, under the Magistrate's decision, was agreed at £792 13s. 7d.

On behalf of the Company, at the sitting of the Court yesterday, an application was made to the Magistrate to state a case.

Gas-Mantle Litigation.

Mr. Justice Grantham recently decided in Chambers a case in which the Welsbach Incandescent Gas-Light Company, Limited, were the plaintiffs, and Mr. C. E. Waycott, of Marlborough Street, Devonport, was the defendant. The Company asked for an injunction restraining defendant from selling or using mantles manufactured in infringement of their letters patent; and they also claimed damages and costs. In November, 1899, the defendant used, through ignorance, several mantles not manufactured by the plaintiffs; and having received from them a notice asking him to refrain from using mantles other than those manufactured by the Company, and to replace those then in use by their mantles, he complied with the notice. About Christmas, 1900, he had from the Company a notice similar to that received in the previous year; but as he had not used any other mantles than the Company's, he took no action after the receipt of the second notice. The Company subsequently issued a writ against him, and it was alleged that a representative called about the end of November, 1900, and examined the mantles then in use. Mr. Waycott said he had no knowledge of this visit, and further denied having used mantles other than those manufactured by the Company. In support of the denial, there were put in affidavits by the defendant, his wife, manager, and messenger, and by Mr. W. Truscott, ironmonger, of Marlborough Street, Devonport. His Lordship dismissed the application, with costs.

Claim Under the Employers' Liability Act.

His Honour Judge Lumley Smith, K.C., and a Jury had before them, in the Westminster County Court, on Monday last week, the case of *Findley v. The Gaslight and Coke Company*, which was a claim to recover £50, under the Employers' Liability Act. The case as put by Mr. Ringwood, who appeared for the plaintiff, was that for some time he had been employed as a labourer at the Beckton station of the Company, part of his duties being to clean out the manholes in the yard. On the afternoon of the 17th of July last, he had just resumed work when he was rendered insensible by the fumes of gas from the sewers. He was taken to the Seamen's Hospital, where he remained two days, and was there attended by the club doctor. After six weeks, he left the Company's service, and obtained employment elsewhere. For the first three weeks he had 13s. 6d. from the club, and then the Company paid him half wages and his club money was stopped. Dr. Ross, of the Seamen's Hospital, said he attributed the plaintiff's state to the great heat, and 48 hours after the attack he would have recovered. The doctor who attended him on admission thought he was suffering from poisoning. Witness was of opinion that intoxicants would have a bad effect on a hot day. Mr. A. Neilson, for the defendants, submitted that there was no evidence of negligence. There had not been an accident of this kind at the works for nine years. His Honour failed to see where the negligence was, and withdrew this point from the Jury; giving judgment for the defendants with costs. He remarked that it was a pity the action had been brought at all. The Company, under the Workmen's Compensation Act, paid half wages. According to the Act, no proof of negligence was necessary. Plaintiff was not satisfied with that, and made up his mind to proceed under the Employers' Liability Act, where negligence had to be proved, to see if he could not get more. His whole loss was £6, taking the half wages he had received; and under the Employers' Liability Act he would have got £9. Therefore the difference was £3; and for this the Jury, Counsel, and Solicitors were brought there. He supposed, however, it was the club. Mr. Neilson said the Company were quite willing to have treated it under the Workmen's Compensation Act.

Trespass by Gas-Meter Inspectors.

At the Leeds County Court last Friday, before his Honour Judge Greenhow, Mr. Charles C. Vevers, a dealer in photographic apparatus, sued the Leeds Corporation for £2 2s.; being damages for trespass. Mr. Foster appeared for the plaintiff; and Mr. Kershaw defended. Plaintiff's case was that on the night of the 31st of October last, while he and Mrs. Vevers were out, two inspectors of gas-meters called at their house; their object being to see the penny-in-the-slot gas-meter. As the house was locked, they obtained a key from a neighbour, managed to open the door with it, and thus secured entrance. They went to the meter, which was in the cellar, overturning, it was alleged, a dish containing food on the way. Being informed of what had occurred, plaintiff called at the gas office the following day to ask for an explanation; and he was then told he would not receive any satisfaction. In the course of correspondence, the Town Clerk (Mr. W. J. Jeeves) said he supposed the key had been left with a neighbour. This was not the case. The evidence for the defence was that when the inspectors called at the plaintiff's house on the morning of the day in question they found it locked. They were about to turn away, when someone called out that the key was at No. 17. It was the custom of many tenants of houses fitted with penny-in-the-slot meters to leave their keys at the houses of neighbours for the convenience of inspectors. On this occasion, the inspectors walked towards the house No. 17, and were met by a little girl who gave them a key. Nothing was said, and the men, thinking this was done in accordance with the wishes of the plaintiff, entered the house, cleared the meter, locked the door again, and gave the key back to the girl. Rebutting witnesses were called, to show that the inspectors first asked if "No. 17's key fitted No. 22," and that then the little girl living at No. 17 offered the key to them. Mr. Kershaw contended that, even if an illegal act had been committed by the servants of the Corporation, it had not been condoned by them. His Honour gave judgment for the plaintiff; adding that it was a serious matter for the men to enter the house as they had done without first having come to an arrangement with the plaintiff or his wife.

Thefts by Lads from Prepayment Gas-Meters.

At the Ipswich Police Court, last Thursday, Leonard Haddock, a boy of 15, was charged, in conjunction with George Suckling, another boy, with stealing money from a gas-meter in the house of Mrs. Mary Ann Young, landlady of a public-house at St. Margaret's Green, Ipswich. Prosecutrix said she was supplied with gas by a slot meter, which stood in the passage close to the front door. On the 18th of January, between seven and eight o'clock, three boys came to the house, and called for a pint of beer, which she served. She recognized the boys as the two lads accused and another named Woods. They did not stay long. When witness went to the meter before retiring, she found it had been broken open, and the money taken out. She had been robbed three times in one week, and on informing the Gas Company they sued her for 11s. 1d. The lad Woods, who was cautioned, deposed to going to the house with the two defendants. He found the lock of the meter unfastened, and he took the money and gave it to Haddock, who handed him back 1s. 11d., dividing the rest with Suckling. A detective stated that when he accused Haddock, the boy said Suckling broke open the meter, and he divided the money. Six weeks ago the same two lads broke open a gas-meter at another house. The Mayor (Mr. W. F. Paul) said Haddock seemed to have made up his mind to spend his life as a thief, and he would be sent to a reformatory school for five years. Suckling, whose record was not quite so bad, would be fined 20s., or fourteen days. The witness Woods was severely cautioned.

In re Mexican Gas and Electric Light Company, Limited.

Last Wednesday, an order was made restoring the name of this Company, which had been struck off the register by the Registrar of Joint-Stock Companies; the Company undertaking to pay the costs and make the proper returns

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of this Company was held last Friday, at the Chief Office, Horseferry Road, S.W.—Colonel W. T. Makins (the Governor) in the chair.

The Secretary and General Manager (Mr. John W. Field) having read the notice convening the meeting, the seal of the Company was affixed to the register of proprietors, and the report and accounts for the six months ending Dec. 31, given last week, were presented.

The Governor: Ladies and gentlemen,—I assume, as usual, you will take the report, which has been circulated, as read. That being so, I will now proceed to make a few remarks upon the working of the half year. Gas companies, as other manufacturers who are dependent upon markets where prices fluctuate considerably, cannot be expected to show a continuous and uniform record of prosperous trading. The accounts, which for five consecutive half years have in each shown a surplus over statutory dividends amounting in the aggregate to £296,755, now record a break in this prosperity, in the shape of a deficit in the amount required for the statutory dividend of £75,185. This adverse result of the half-year's working is to be attributed to two causes—first, the abnormal price of coal; and, secondly, the abnormally mild weather, especially during the month of December. The first of these causes has involved the Company in an additional expenditure of £280,122, or, after allowing for extra income from coke and breeze, of £191,446. The warm and clear weather has resulted in a considerable reduction in the quantity of gas sold. The several causes which are referred to in the report as having brought about the reduction in the consumption of gas, are together responsible for the actual loss in net profit for the half year of (say) £50,000. As the profits are short of our full statutory dividend, as I said just now, by £75,185, there can be no doubt that, had there been a normal increase in our business, the result of the half-year's working would have been, instead of the deficit shown, a small surplus. The adverse influences upon our working—cost of coal, more economical use of gas, and the effect of the abnormally high price of gas—will certainly be felt throughout the half year which we have now entered upon; and it is only fair, to both the shareholders and the consumers, that this fact should be made quite clear. There can be no reduction in the price of gas; consequently there can be no increase in the rate of dividend until the conditions under which we are working as regards our coal supply become more favourable. But looking beyond the 30th of June next, the prospect is satisfactory; for then there is a certainty of a considerable fall in the price of coal. Indeed, the reduction is already in progress. I will not commit myself to any specific figures, but there is already a considerable decrease in the price of coals purchased on contract; and by the end of the winter season, if the present downward tendency is further developed, we shall be able to discuss prices with our contractors on far more reasonable terms than was the case last year. More than this, the several companies having the supply of "Solar" and other oils suitable for the enrichment of gas are also quoting much lower prices. So that there will certainly be a material reduction in the first cost, subject, of course, to a corresponding reduction in the value of coke. But the net figures will be undoubtedly in favour of the Company. The only class benefiting by the existing condition of the coal market are the coalowners and the coal miners; and their prosperity has been purchased at the cost of a very serious check—I might say a dangerous check—to the principal industries of the country, and of a loss to the gas consumers in the Metropolis alone of £850,000 for the year. And this is not all. In common with other Companies, we have to complain of the quality of the coal we are now receiving. It is in very many cases seriously inferior to that of our supplies two years ago. There are, I am glad to say, notable exceptions among our contractors; but I forbear to state in figures the amount of loss this Company have sustained during the past year from the shipments of very bad coal from what we have hitherto considered first-class contractors—first-class collieries. I desire to state quite plainly that there is no excuse whatever for this state of things. We are paying 8s. to 10s. per ton more for our coal than we were in 1898—an increase which represents, for this Company alone, an additional payment to the coalowners of £900,000 a year; and we had a right to expect that at least some small portion of this enormous sum would be applied by the colliery owners in maintaining, by cleaning and other means, the quality of the coal. This has not been done. Of course, we are making claims against the principal offenders; but no claim on which we can recover can bear any proportion to the loss the Company have incurred by the carbonization of bad coal. I am quite prepared to hear, when the other Companies' meetings take place, of similar experiences in their cases. I will now deal shortly with one of the causes which I have referred to as affecting our gas sales. I refer to the extension of the use of improved burners—incandescent or other high-power burners. I need not say that we welcome these improvements as greatly strengthening our position, and the position of gas companies generally, in their competition with the electric light. Most of you have doubtless seen those magnificent lights at the refuges near Victoria Station, at Wellington Street in the Strand, and at Whitehall, which have been fitted up by Messrs. Sugg and Co. These are all on the Somzée-Greyson principle, and in every case take the first place when compared with the neighbouring electric light, not only in increased brilliancy of illumination, but also in greatly reduced cost. I am glad to acknowledge the assistance which was given to the Company in extending the various systems of improved street lighting by the officers of the Local Authorities; and I hope, when the new Borough Councils are settled down to work, that these economical systems of gas lighting will be still further extended throughout the Company's district. We certainly are prepared to afford them every possible assistance in carrying out such improvements. I do not know that I need add to what is stated in the report as regards our several residual products. The improvement in the yield of £70,210, would have been some £15,000 more had it not been for stoppage, by the Boer War, of the working of the gold mines in South Africa. In connection with this, I should also mention that in the item of annuities, there is an amount of £1422 which has been paid to the dependents of those reservists in the Company's employ who have rejoined the Colours. A far larger contribution to the cost of the war is included in the item of rates and taxes, which has also to bear an increased amount of income-tax, which, as you know, is now raised to 1s. in the pound. Another item in the accounts which, by its importance, calls for special notice is wear and tear. The expenditure for the half year was £218,149, or £39,172 more than in the December half of 1899. It is unfortunate that this large increase in expenditure under this head should have been necessary at the time when the Company's income was burdened with a heavy coal bill; but the fact was that, as the time had come round for considerable repairs in some of our large retort-houses, it was obviously prudent to take advantage of the opportunity offered to reconstruct them on modern lines, with a view to the further extension of labour-saving appliances. This expenditure will bear fruit in reducing the cost of working next winter. Indeed, had it not been for the delay arising from the pressure of work in the iron trade throughout the country, some part of the plant represented by this special expenditure would have been in use during the current winter. Turning now to the capital account, you will find that our expenditure has again been strictly limited with respect to the outlay on meters, stoves, and service-pipes, without which the extensions which we are bound by law to undertake would be impossible. The capital expenditure has been, without these items, only £44,700, of which the following are the items: At Beckton, purifier-house and purifiers £16,000, exhauster-house, exhausters, and boilers £7500, oil-gas plant £1600, and West's stoking machinery £9600. At Bromley and Shoreditch, Foulis stoking machinery £9800. At Fulham, Kensal Green, and Nine Elms, oil-gas plant, &c., £200 18s. 11d. That together makes the £44,700 18s. 11d. which I referred to. Then, in addition, there are mains and service-pipes £24,238, meters £21,197, and stoves £19,709—or a total of £109,845. But against this amount we have a credit for the sale of some of our land adjoining the Fulham works, for which we received £29,338; so that the net expenditure for the half year amounts to £80,506. And now, before I leave the accounts, I will give you a short summary of the net results of the half-year's working. Rental has given us £1,734,196; and the net expenditure has been £1,282,545, which shows a gross profit of £451,651, as compared with the gross profit in December, 1899, of £614,885. After deducting the fixed charges, which amount to £196,653, the balance available for dividend on the ordinary stock remains at £254,998; but this is short of the amount required by £75,185. That is the result of the half-year's working; but if we take the whole of the year, the net profit has amouuted to £688,268, and the ordinary dividend to £660,031; so that you see for the whole year we have a surplus of £28,237. I do not think, looking to the diminution in dividends of railway and other companies, that we have very much to complain of. Now this amount, added to the surplus brought forward from 1899—namely, £193,333—gives you the £221,570 which is carried forward to the credit of the current year's account, undivided profit. You will see by the report, that the quinquennial valuation has taken place, and that the terms we have obtained are more favourable than those of 1895. Indeed, we have secured a material reduction in the percentage of the valuation when compared with both 1895 and 1890. We did not, of course, obtain all we asked for; and we are not satisfied that we have obtained all that we ought. But considering that the price of coal is an item which enters so largely into the calculation of the valuation of the Company's undertaking, and that its reduction has already become a fact, and also considering that the costs of an appeal to Sessions, whatever the result may be, would be very serious (as we know by experience), and further the great uncertainty under existing legislation of the result of such an appeal, we decided to accept the figures as amended by the various Assessment Committees. In connection with this, I may add that we have to record a further increase in the rates in the pound. I will give you the list for the last four half years. In June, 1899, the rate amounted to 6s. 4d. in the pound; in December, 1899, to 6s. 5¼d., which was 1¼d. in excess; in June, 1900, to 6s. 6¾d.; and in December, 1900—that is, the half year we are dealing with—to 6s. 9¼d. So you will see that, within two years there has been an increase in the rates of 5¼d. in the pound upon the Company's assessment; and this equals, in money, £17,000 a year. I will now deal with the important matter of raising capital, which is the subject of one of the paragraphs in the report. For July, August, and September, the price of our ordinary stock, less accrued dividend, ranged from 96 to 99 per cent. In October, there being a marked improvement, we offered for sale by tender £125,000 at par, with the result that £48,055 was taken up at an average price of £100 3s. 8d. per cent. The balance was then, in accordance with the provisions of our Acts, offered to the shareholders at the reserve price (par); and a further sum of £38,755 was taken up. This left us with a balance of £38,190 to place. At the same time, we offered for sale £100,000 of 3 per cent. debenture stock, and sold £69,450 of it at or above the reserve price of 94, which left us a balance of £30,550 of this stock on hand. Last December, we hoped to place at sale by auction these balances and further sums of £125,000 of ordinary stock and £100,000 of debenture stock; but as, upon the announcement of the proposed sale of ordinary stock, the gas stock market became unfavourable—I will not say what the cause is, but we all know that it has most remarkable fluctuations whenever an announcement is made of our stock to be sold—and as we were advised by Counsel that the Company had no power to place upon the ordinary stock a reserve price below par, there was no course open to us but to postpone the sale until money became cheaper, and the market better able to deal with such an amount of stock. Perhaps I might interpose for a moment to point out that this has arisen out of the consolidation. Of course, £100 now of our stock at practically the par value is only £40, and therefore it would never occur to anybody when you put on £100, or something less than £100, that you were selling stock at a discount. But, unfortunately, there is nothing in our Acts which recognizes

this fact, and £100 of stock is taken to be £100 of stock; and therefore we were hung up in the way I have described to you. This inability to raise money by the exercise of our capital powers resulted in great financial inconvenience; and we have accordingly been obliged to avail ourselves of assistance which our bankers have most courteously afforded us to a greater extent than on any previous occasion. Indeed, had it not been for their undertaking to make the necessary advances, we should have been compelled to postpone the payment of the dividend to much later than has been customary for many years past. But, as you know well, excessive borrowing from bankers is not only inconvenient, but is a most expensive mode of raising money; and it is greatly to be regretted that, because of the opposition of the Local Authorities last year, Parliament did not feel justified in granting the Company the further capital powers sought by their Bill. We have little doubt that, had the Bill been passed, the Company would have been able to raise the money at 3 per cent.; whereas we are now paying 5 per cent. on a large and increasing amount of borrowed money, which involves considerable loss both to the Company's consumers and to the shareholders. We hope that, having placed these facts before the shareholders, when next an offer of stock is made to them by auction, tender, or otherwise, they will respond to the full extent of the amounts offered, and so enable us to restore a proper balance between capital and revenue. I will not deal at the present moment with the paragraph of the report which refers to our Bill in Parliament, because, under legislation, we have to hold a special meeting at the close of this, when I will deal with that matter. In the next paragraph there is a short summary of the parliamentary work in prospect for the coming session. As regards the proposals to be submitted to Parliament for the extension of the use of electric motive power as a means of traction for railways and tramways, all we seek is protection for our mains. As to the general policy of such undertakings we have nothing to say, either for or against; but we must make it clear to Parliament or to the Board of Trade, as the case may be, that this is not with us a question of money. If the danger to our mains from electrolysis is as great as some scientific men believe it to be, the danger does not stop there. Should damage be caused to our mains, the danger to life and property from gas explosion follows as a matter of course. This is a responsibility we cannot trifle with, but must bring clearly before the authorities who have the granting of the powers to these electrical undertakings. I am glad to say that in this matter we are co-operating with the other Metropolitan Gas Companies and the Water Companies. The only other Bill to which I need refer is that of the South Metropolitan Gas Company, by which permissive powers are sought by the Company to acquire this Company's district south of the Thames and the works at Nine Elms. I have before stated that this is a purely sentimental matter, and so I think it is now; for no one would be one penny the better if the proposed transfer were carried out on equitable terms. Moreover, the proposal has already been the subject of inquiry by Parliament, and though similar provisions in the South Metropolitan Company's Bill of last year were passed by Mr. Oldroyd's Committee in the House of Commons, they were refused when the Bill came before the Committee in the House of Lords; and, so far as this Company is concerned, the question was then considered closed. Certainly no obligation can any longer, under these circumstances, rest with either of the two Companies to endeavour to give effect to this special recommendation of Sir James Rankin's Committee. The South Metropolitan Company, however, appear anxious to secure these powers; and we shall not oppose their application. We shall leave the matter entirely to Parliament, and be content only to watch the Bill through its several stages. But if the powers are granted to that Company untrammelled by any conditions obnoxious to this Company, and if the Company think it worth their while to offer for this particular section of our undertaking such terms as would make it worth our while to sell, we shall be ready again to consider the matter; and at this stage I do not think I need say anything further on the subject. Before I put the resolution, there are three personal matters I wish to allude to. The first is the approaching retirement of the Company's Consulting Constructing Engineer, Mr. Trewby, after a service extending over 36 years. Mr. Trewby's health last winter was the cause of some anxiety, and he was advised by his medical attendant not to expose himself to risk from inclement weather. In view of the approaching winter, therefore, last autumn arrangements were made for his retirement, should it become necessary. Happily, so far, the mildness of the winter has enabled Mr. Trewby to remain at his post; and even should he have to give up the tenure of his office, we have, under these arrangements, secured to the Company the advantage of availing ourselves of his long experience in consultation, in giving evidence, and in other matters. I am quite sure the shareholders will join with us in wishing that Mr. Trewby may for long enjoy, with better health, the freedom from constant care and anxiety which, when it takes place, his retirement should produce. We have also to very greatly deplore the sudden death of Mr. Trewby's Assistant, the late Mr. Randall, which deprived us of a most valuable and valued officer just at a time when we might have looked to his filling the office to be vacated by Mr. Trewby. Mr. Randall was in the full prime of life. He was most able, and most highly esteemed by the Directors and by his brother officers in the Company's service. The third personal matter is the death of our old friend Mr. Chisholm, who, as many of you will recollect, was our Auditor from 1864 to the close of 1899. He passed away on the 16th of December at the ripe age of 91. As there is still the other important matter to deal with at the Wharncliffe meeting, I will not detain you longer now, but will formally put the following resolution: "That this meeting do agree with and confirm the report of the Directors and the Auditors' report and the statement of accounts of the Company, as transmitted to the proprietors on the 28th of January."

The Deputy-Governor (Mr. Howard C. Ward) seconded the motion.

No proprietor rising to ask any questions,

The Governor put the resolution, and declared it carried *nem. dis.*

A resolution authorizing the payment of the dividend as set forth in the report, was next submitted, and carried unanimously.

The retiring Directors (Messrs. Ulick J. Burke and John Birch Paddon) and the Auditors (Messrs. Allen Stoneham and J. J. Walker) were then re-elected; and this portion of the business closed.

The Wharncliffe Meeting.

The Secretary and General Manager having read the notice convening the meeting,

The Governor said the business before the proprietors was the consideration of the Bill, which he would ask the Solicitor shortly to describe.

The Solicitor said the Bill was almost similar to that which was approved by the shareholders and came before Parliament last session, except that there was a reduction in the amount of capital to be raised, and a provision with regard to the redemption fund, which, no doubt, the Governor would explain in detail. He then shortly stated the effect of the provisions of the proposed Bill.

The Governor: I think I had better preface my remarks in reference to this question with a short summary of our recent applications to Parliament. In 1899 we introduced a Bill for power to raise the sum of £2,500,000 by 3 per cent. debenture stock, and to acquire additional lands. That was the same amount that we got in 1876. The Bill, as you will recollect, passed through all its stages in the House of Commons, but failed to pass when it came before a Committee of the House of Lords. No reason was assigned for its rejection; but we were left to surmise that their Lordships considered it more respectful to the Lower House to refrain from passing the Bill pending the inquiry into the powers of charge of the Metropolitan Gas Companies by a Committee of the House which was then sitting. In 1900 we reintroduced the Bill of 1899 in the form in which it had left the House of Commons in that year; and though, while the Bill was before the Committee of that House, no intimation was given from the chair of any wish on the part of the Committee for the insertion in the Bill of any provisions to meet the recommendations of Sir James Rankin's Committee, the Chairman declared the preamble of the Bill not proved, because, as he said, the Bill was not framed with a view to complying with the recommendations in question. These, I may remind you, were only communicated to the Committee on the occasion of the second reading of the Bill by special resolution of the House; and this resolution was not in a mandatory form, but simply an instruction to inquire as to the application of certain of the recommendations in the case of this Company. Well, the Bill having been rejected, last autumn we had to enter upon the consideration of the preparation of a Bill for this year; and the question arose how far it was necessary or expedient for us to include provisions dealing with Sir James Rankin's Committee's recommendations. We fully discussed that. Those who read the Blue Book, or interested themselves in the matter, will remember that there were five recommendations of the Committee. The first had reference to a new sliding-scale of price and dividend. The second had reference to the transfer of our southern district, which was dealt with in the Bill of last year, and as to which I have just told you a Bill has again been brought forward by the Southern Company. The third referred to the charge for automatic meter supply over and above the authorized charge for the gas consumed—that is, the charge for the use of the meter and appliances. The fourth was a recommendation limiting the grant of capital by Parliament; suggesting a limit of five years for future grants. The fifth was a recommendation that something should be done in the way of the redemption of obsolete capital. The second recommendation has already been submitted, as you are aware, to the consideration of a Parliamentary Committee by the South Metropolitan Gas Company, and has been rejected. The third has also been considered by the same Committee; and a short Act was passed last year embodying the principle of the recommendation. The Bill which we submit to-day contains provisions for dealing with the two others. In it we limit our application for money to £1,000,000. That is certainly well within five years' requirements. The £1,000,000 will be needed for capital purposes within the next four or five years; and we present a scheme for the redemption of capital. The reason we do not adopt the first recommendation is that such terms for raising capital as one moiety of ordinary stock, which could not be obtained at a lower rate than from 4½ to 5 per cent. whatever the new sliding-scale of price and dividend might be, and one moiety as debenture stock bearing 3 per cent. interest, would involve a charge for capital of 3⅞ or 4 per cent. on the total capital so raised; whereas the plan we suggest, under the Bill, of raising the whole capital by debenture stock at 3 per cent., would be greatly to the advantage of the consumers of gas, and would be the most direct mode of giving effect to the object the Committee had in view when framing the particular recommendations—namely, the reduction in the price of gas. I may say that when we first approached this subject, out of several schemes we selected one based on the principle of mixed capital. But when the Bill was settled by Counsel, he advised us strongly that the simpler plan we had in former sessions submitted to Parliament was obviously a more advantageous one for the consumers; and we accordingly decided upon the scheme which is now before you. So much for the course as regards these recommendations. I will now explain the clauses of the Bill itself. With one important alteration, the principles of the measure are the same as those of the Bill we had before us on the 2nd of February last year. We then asked power by that Bill to raise £2,500,000. By our present Bill, we seek powers to raise £1,000,000 only. Such a sum will bring us within the limits set by the fourth recommendation of Sir James Rankin's Committee. It has been generally considered—and I certainly see no reason to challenge the view—that in the public interest frequent applications to Parliament are objectionable, on the ground of their very great cost. However, the Parliamentary Committee of 1899 enunciated a new principle as applied to the Metropolitan Companies; and we have accordingly so modified our application this year. It is unnecessary for me to say anything as regards the need of the Company for these additional money powers. I can add nothing to what I said last year, and at the earlier meeting to-day. It is simply imperative, unless we are to be relieved from the responsibility for the supply of gas in our district, that we should be granted further capital. The novel, and important, provision in the Bill now before you is the one providing for the redemption of capital. This is the principle adopted by Parliament in dealing with the Bills of the Metropolitan Water Companies; and it is, in fact, the application to joint-stock companies of the principle of the sinking fund

which is, I believe, always a condition attached to money powers granted to local authorities. But in drawing up our scheme, we have decided to proceed on a somewhat more liberal basis towards our consumers than any precedents seem to require, so as to close, if possible, this prolonged and most costly parliamentary struggle. Our proposal is that the redemption fund should be a first charge upon the dividend on the ordinary stock, whenever the profits available for division among the holders of that stock (subject, of course, to the sliding-scale provisions of our Acts) are more than 4 per cent. After you have received 4 per cent., you will obtain no increase of dividend until 5s. per cent. has been set apart for the redemption of capital. But the operation of this scheme will not reduce your ordinary dividend below 4 per cent.; and the contribution of 5s. will be a deduction strictly limited to the ¼ per cent. of the amount of dividend payable to the holders of ordinary stock, whenever the profits of the Company and the price of gas permit of the payment of dividend at a higher rate than 4 per cent. per annum. Now I will state it in tabular form; and I think you will understand it perhaps a little more clearly. Supposing the authorized dividend is £4 2s. per cent. or £4 4s. per cent., 2s. or 4s., as the case may be, will be deducted for redemption purposes. If the authorized dividend is £4 5s. per cent., 5s. will be so deducted, and applied to redemption purposes. If the authorized dividend is £4 6s. per cent., 5s. will be deducted for redemption, and 1s. additional dividend will be distributable to the proprietors. If the authorized dividend were £4 10s. per cent., 5s. would be so deducted, and 5s. more dividend would be distributable among the shareholders. And so on. In short, the ultimate effect of the scheme is a reduction of the Company's standard price of gas from 3s. 9d. to 3s. 6½d. That is the effect of it. It is not done in that form; but that is the money effect of it as regards dividend. I do not know that all the shareholders quite fully understand that this 4 per cent., which I dwell so much upon, is the equivalent of the old 10 per cent., which was the standard dividend before the stock was divided up. The ultimate effect of the scheme is, as I say, a reduction of the Company's standard price equivalent from 3s. 9d. to 3s. 6½d. We tell you quite plainly that we object to modifying, even in this degree and to this extent, the parliamentary decision of 1896, the solemn nature of which you will recollect I set clearly before you at the last half-yearly meeting, and which, if it is again desired, I will explain to the shareholders later on. But as it appears to be the opinion of Parliament that some special arrangement should be made in the case of companies having what is termed obsolete capital, and as, by reason of the early incorporation and unique record of this Company (you will remember that it is now getting on to its century of existence, for it is now about 86 years old), we have undoubtedly a larger capital per ton of coal and per 1000 cubic feet of gas than the other Metropolitan Companies, it has seemed to us, after the fullest consideration and after the fullest consultation with Counsel and otherwise, good and reasonable to apply this special recommendation to our case, and in its application to put upon it a liberal interpretation. The operation of this provision is intended to come into force on Jan. 1, 1902; and there is good reason to believe that the price of gas by that date will permit of the distribution of a dividend for that half at the present rate at least, after setting aside the contribution to the redemption fund. There is one other provision in the Bill calling for notice, and that is the restriction to be placed upon the application of the reserve fund. Hitherto this fund has been available for making up the amount of the full statutory dividend. We now propose to limit the application of the reserve fund to the making up of what is known as the standard rate of dividend—that is, 4 per cent. on the converted ordinary stock—so that if in any year the profits earned, *plus* the balance of undivided profits (if any) brought from the preceding year, are insufficient to pay 4 per cent., then the reserve fund can be drawn upon; but the fund cannot be drawn upon either to pay a larger dividend than 4 per cent. or for the purpose of redemption of capital. This is the scheme which we submit to you, and which we advise you to adopt and confirm. The land clauses in the Bill are simply for the transfer of land held in trust by the Directors, and giving a parliamentary title to them. They are at present in the names of Trustees. I do not think there is anything else I can say with reference to the Bill; but if there is anything that I have omitted, probably some shareholder will ask a question upon the point. I feel very much indeed that this is a necessary departure from what has been the policy of Parliament as applied to gas companies hitherto. But we are in the hands of Parliament; and after the intimation which was given by the Chairman of the Committee last year, I do not see how we could possibly have brought in our Bill without giving some attention to those remarks. I beg to move—"That the Bill now submitted, intituled 'A Bill to enable the Gaslight and Coke Company to raise additional moneys, and to enable the Company to purchase and hold lands and for other purposes,' be approved, and the same is hereby approved, subject to such amendments and alterations as may be made therein by Parliament and be assented to by the Directors."

Mr. WARD seconded the motion.

A SHAREHOLDER asked whether the redemption fund was to be applied to the ordinary stockholders.

The GOVERNOR replied that it was not.

A SHAREHOLDER asked how long the process of redemption would continue.

The GOVERNOR said it would continue until the capital had been wiped out.

A SHAREHOLDER said he noticed that the Chairman, in his speech, had used the words "obsolete capital;" and he should like to know whether it was only the obsolete capital that was to be wiped out.

The GOVERNOR said it was not. That was merely the term used by the Chairman of the Committee; it did not earmark any capital. They would apply the 5s. per cent. to the purchase in the market of ordinary stock to the extent of £1,000,000. The effect would be that the shareholders would suffer a reduction of dividend on the "A" stock. Supposing the dividend were £4 8s., when the Bill came into operation the shareholders would receive £4 3s. in dividend, and 5s. would go to the redemption fund. He did not think this would diminish, but rather increase, the value of the stock. It was quite possible that the Company might pay the same dividend that was declared last year—namely, £4 18s.—in which case £4 13s. would go as dividend, and 5s. to redemption. The capital of the Company per 1000 cubic feet was 12s. or thereabouts; while that of the South Metropolitan was 8s. or thereabouts, and that of the Commercial Company 9s. or thereabouts. But apparently the view of Parliament was that the Company should get rid, by a sinking fund, of the excess capital, so as to reduce the capital to something nearer the limits of other companies. The excess capital was not due to mismanagement, as many people supposed, but to the fact that the Company had been in existence longer, and had spent their capital in days when it was not so profitable; in addition to which there was the removal to Beckton. The practical effect would be to reduce the dividend by 5s. per cent. per annum.

A SHAREHOLDER inquired how many years it would take to wipe off the £1,000,000.

The GOVERNOR said he thought about 25 or 26 years.

A LADY SHAREHOLDER asked whether, considering the Company was so terribly over-capitalized, it was wise to increase the capital.

The GOVERNOR said this was a very sensible question to ask. They would be the last persons to desire to increase the capital were they not under a legal obligation to supply gas to whoever applied for it. If a new street were made, they were bound to lay down mains; and this could not be done without capital. Whatever might be the fluctuating increase or decrease on the rentals, they must comply with their parliamentary obligation to supply gas to any consumer who asked for it.

The resolution was passed unanimously.

A vote of thanks to the Governor for presiding, and to the Directors and staff for their services to the Company, concluded the proceedings.

BRENTFORD GAS COMPANY.

The Half-Yearly General Meeting of this Company was held last Friday, at the Charing Cross Hotel—Mr. HOWARD CHARLES WARD in the chair.

The SECRETARY (Mr. W. Mann) read the notice calling the meeting; and it was agreed to take as read the report and accounts, from which some particulars were given last week.

The CHAIRMAN moved the adoption of the report and accounts, remarking that he thought the Directors and proprietors had good reason to be satisfied with them considering the unusual time through which gas companies had passed during the last six months. The unusual circumstances of the half year which had been very hostile to the production of good gas accounts, had been three. In the first place, there had been an abnormal—he was going to say wicked—rise in the price of coal. Secondly, there had been mild and light weather during the portion of the half year when they expected it to be cold and dark. In addition, they had not, as almost every Metropolitan and Suburban Gas Company had done, raised the price of gas. The expenditure on coal had been higher in the case of many of their neighbours than in their own; and he thought the Directors might take a certain amount of credit for having had a pretty good contract which they were able to turn into one for a longer period. Still, he did not think that they deserved much more credit than their neighbours; for, as a matter of fact, it was rather by luck than by prescience that they had the contract. They had, in consequence, a comparatively small rise in the price of coal—that was to say, the rise in price, compared with some other companies, was not much more than one half. The average increase in their own case during the half year was 3s. 8d. per ton. Even this was an enormous sum when they came to consider that roughly it represented about 4½d. per 1000 cubic feet of gas. The next thing was the mild weather, which had been simply remarkable. For the quarter ending Michaelmas, they had an increase of 6 per cent.; but from that time it began to fall off, until in December they had an absolute decrease, which was a thing hardly known in that month. He marked this because in the report it was stated that they had only had an increase in the half year of 1·6 per cent. This was very little; and it emphasized this point—that a rise in the price of gas had very little to do with a diminution in consumption; it was really the temperature that was the greatest factor. As most of the proprietors were aware, there had been a considerable reduction in the amount of gas consumed in the district of the Gaslight and Coke Company; and, in their own case, they had, without raising the price of gas, suffered an almost similar reduction in the rate of increase, only in the case of their neighbours there had been an actual diminution. But in spite of all these drawbacks, and although they had written off very liberally, they had made their dividends of 5, 12, and 9 per cent., and still had a surplus of £900. Taking the whole year, they had earned their dividends, were going to place ½ per cent. to the reserve fund, and were carrying £4213 to the undivided profits. He thought this result was extremely good. He should like to call attention to the effect the rise in the price of coal had had upon the business during the half year in another direction. The rise had, of course, caused a regular scare among the consumers; and people generally had wanted gas fires and cooking-stoves. Now depreciation was written off very liberally for fittings, coin meters, stoves, and so on, on the principle that in the course of a few years it would all, or very nearly all, be written off. But during the past half year, when the rise in the price of coal came, they had just double the number of applications for stoves that they had in the corresponding period of the previous year. While depreciation in the corresponding half year about overtook the capital expenditure for these things, in the past half year the depreciation on stoves only amounted to about half the sum they had had to lay out to meet the applications for them. As a matter of fact, they spent on stoves £6673, and they wrote off on account of them £3854. They had been pursuing this policy of writing off the value of prepayment meters, fittings, and stoves for some years; and the result was this. The total capital expenditure to date from July 1, 1894, on coin meters was £46,780; and since then, they had written off for depreciation £17,586—leaving the present net capital value of the coin meters at £29,194. Of course, the capital value would run off very rapidly at this rate. In regard to fittings, they had written off £19,969, which left the net capital value at £18,451. Then the total capital expenditure on stoves, which stood at £56,429, had

been reduced by writing off £18,169; so that the net capital value of the stoves in the district was now only £38,259. During the past half year, the amount of depreciation written off the coin meters, fittings, and stoves was £9088. He thought that this statement and the result of the working in the half year were very gratifying. Among other points, he said that the increase in the number of ordinary consumers in the six months was 836, of ordinary stoves 1031, of prepayment consumers 794, and of prepayment stoves 765. Although they had had this great demand for stoves, they had had an absolute decrease in the amount of gas consumed in December. Another matter which he thought would be interesting was this: The business of a gas company during the past few years had altered a good deal—that was to say, they had now a great daylight consumption as well as the consumption during the hours of darkness. The proportion of gas used for heating and cooking during the day was really very remarkable. He had a comparison of the consumption on corresponding Sundays of 1891 and 1901. In nine hours of daylight in 1891, the consumption was 580,000 cubic feet; while in 1901 it was in the same time 1,699,000 cubic feet, or 193 per cent. increase. On another day in 1891 during the same hours, the consumption was 527,000 cubic feet; while in 1901, in the corresponding time it was 1,856,000 cubic feet—an increase of 252 per cent. During fifteen hours' darkness on the same days, the increase was only 38 per cent., which compared with the 193 per cent. and the 252 per cent. increases during daylight. This showed what an extensive alteration had taken place in the nature of a gas company's business; and although they had suffered a good deal from people using high-power illuminants, still the employment of gas for cooking and heating had become so general as to amount almost to a necessity of life. Referring next to the offer of new stock by tender, he said the result was that they had had it applied for almost three times over; and the average price was £106 18s. 10d. This was not its value, because it stood on the market at the present time at £113. Still it was not a good thing to be indebted to their bankers. They managed to avoid issuing the stock for a long time; but the increase in the business rendered it absolutely necessary they should have the money. As to the future, he certainly thought there was a prospect of a reduction in the price of coal.

Sir R. H. WYATT seconded the motion.

Mr. W. HUGHES remarked that he noticed an amount of £17,800 in the balance-sheet due to bankers for overdrawn account.

The CHAIRMAN said that was why the new stock was issued. It would be seen that they had stocks in hand amounting to £48,550; and there were accounts due to the Company for gas and meter-rental for the quarter and arrears outstanding amounting to £73,477. So that they had to find about £120,000. Then turning to the capital account, it would be seen they were indebted to revenue account to the extent of £12,218. Taking all these things into consideration, it was impossible for the Company to go on without issuing new stock. Replying to a further question, he agreed that the electric light occasioned the loss of some customers; but the increase in daylight consumption more than compensated for the loss.

Mr. J. HUSBAND, the Engineer, in answer to the Chairman, stated that at Ealing, where electric lighting was used, the Local Authority were going in for incandescent gas-lights as well.

The CHAIRMAN further remarked that since the beginning of this year there had been a 4¾ per cent. increase in gas consumption.

The motion was unanimously carried.

Dividends at the rates of 5 per cent. per annum on the preference stock, 12 per cent. on the consolidated stock, and 9 per cent. on the new stock having been declared,

A resolution was passed to the effect that £3250, being equal to ½ per cent. for the year in respect of the dividend on the consolidated and new stocks, be placed to the reserve fund, which amounts to £8245.

The retiring Directors (Messrs. H. C. Ward, Ulick J. Burke, and R. J. N. Neville) and the Auditors (Messrs. J. W. Field and Monier F. Monier-Williams) were all re-appointed.

The CHAIRMAN, in responding on behalf of himself and his re-elected colleagues, mentioned that he had served the Company for about fifty years. When he first joined the Board the capital was about equal to £12 to £13 per ton of coal carbonized; while now it only amounted to £5 17s.

A hearty vote of thanks to the Chairman and Directors and officers ended the proceedings.

CRYSTAL PALACE DISTRICT GAS COMPANY.

Half-Yearly Report and Accounts.

The report which the Directors of the above-named Company will present at the half-yearly general meeting next Friday opens with an expression of pleasure on their part that the difficulties consequent upon the great increase in the price of coal are passing away. The contracts to be made in the spring will be at considerably lower rates than those now running; and a reduction in the price of gas will probably be made at Midsummer. The Directors go on to state that in the six months ending Dec. 31, 1900, coal cost £1 0s. 5d. per ton, against 14s. 7d. in the corresponding half of the previous year—an advance of 5s. 10d. The receipts for coke per ton of coal advanced 1s. 10d., or rather less than one-third of the extra cost of coal; while other products remained stationary in price. The deficiency is met by the increase in the price of gas, by reductions, under the sliding-scale, of the shareholders' dividend and of the profit-sharing bonus of the employees, and by absorbing £4642 of the balance of £4795 brought forward on the net revenue account, but leaving the reserve fund (£36,595) intact. The proprietors are reminded that the Directors in 1894 adopted a profit-sharing arrangement with the officers and workmen, whereby 1 per cent. is paid on salaries and wages for every penny at which gas is sold below 3s. per 1000 cubic feet. The price of gas at 2s. 6d. gave them for the twelve months ending last June a bonus of 6 per cent. The increase in price to 2s. 10d. reduces their bonus for the current twelve months to 2 per cent., or in money from £2052 to one-third of this amount. By that arrangement the employees have a direct interest in reducing the price of gas. The Directors express their great satisfaction in reporting that the employees have taken the loss in the right spirit, and are doing their work cheerfully and well. By means of the profit-sharing system, nearly all the employees have become shareholders, holding ordinary stock to the value of £10,400. In addition, they have deposited with the Company at interest £2200, or together a total of £12,600, as the result of six years' working of the system. The Directors recommend a dividend at the rate of 5 per cent. per annum.

The statistical statements accompanying the report show that the expenditure on capital account in the past half year was £7913, the bulk of it being for new mains and services, meters, and stoves; and it brought the total up to £740,812. The outlay on revenue account was £101,586; of which £86,257 was for manufacture, £7491 for distribution, and £3598 for management. The £86,257 includes coal, £58,251; oil and coke for making oil gas, £2933; purification (ordinary gas), £2981; do. (oil gas), £375; and carbonizing wages, £7002, including £189 for oil gas. The revenue from the sale of gas was £80,056; meter-rents (15,671 ordinary and 11,242 slot) amounted to £1910; stove-rents (6832 ordinary and 9019 slot), £1958; residuals produced £31,385; and the total receipts were £115,318. The balance carried to the net revenue account is £13,732; and the sum applicable for distribution shown on that account is £15,694. Under the supervision of Mr. S. Y. Shoubridge, the Company's Engineer, 57,034 tons of coal, 33 tons of cannel, together with 102,007 gallons of gas oil, and 320 gallons of carburine, were employed in the production of 588,215,000 cubic feet of coal gas and 46,563,000 cubic feet of oil gas (15-candle)—making a total of 634,778,000 cubic feet, of which 570,713,000 cubic feet were sold and 579,157,000 cubic feet accounted for. The production of residuals was: Coke, 670,878 cwt.; breeze, 17,358 yards; tar, 586,911 gallons; and ammoniacal liquor, 10,369 butts—the quantity of sulphate made being 333 tons. In the production of oil gas, 21,302 cwt. of coke and 530 yards of breeze (estimated quantities), as well as 5200 gallons of tar, were employed.

PROVINCIAL GAS AND WATER COMPANIES.

We commence to-day our usual notes on the progress made by Gas and Water Companies in various parts of the kingdom whose reports and accounts come to hand about this time.

Gas Companies.

The 103rd half-yearly meeting of the Bury St. Edmunds Gas Company was held last Friday—Mr. F. C. Andrews in the chair. The Directors reported that the output of gas had been fairly maintained in the six months ending Dec. 31; while the new office and show-room had proved very convenient to the customers, and had led to many inquiries which should result in a steady increase in business. Dividends of 10s., 7s. 6d., and 7s. per share on the 1849, 1859, and 1879 capital respectively were recommended. In moving the adoption of the report, the Chairman stated that, notwithstanding the expenses necessitated by fitting up the show-room, the position of the Company's account at the bank had been improved. The report was adopted.

In the report of the Directors of the Calverley and Horsforth District Gas Company, it is stated that the balance of net profit, after deducting the interim dividend of £1575, and providing for the interest due upon loans, amounts to £3528, from which the statutory dividends are recommended for payment.

The Chairman of the Cambridge Gas Company (Mr. E. H. Parker) told the shareholders, at the half-yearly general meeting last Wednesday, that a better result per ton of coal carbonized had been obtained in the past half year. At Christmas, 1899, the result was 9845 cubic feet per ton of coal; while last half year it was 10,458 cubic feet. The profits amounted to £4830, which was not enough to meet the fixed charges and provide the maximum dividend, which would absorb £4600; and if they would look at the profit and loss account, they would see that the Directors had paid interest on the mortgage bonds amounting to £532, and that the bankers' interest on their current account came to £134. The result was that they had not made sufficient to meet their fixed charges and maximum dividend by £434. The item of unaccounted-for gas was still high—something like 10 per cent.; being an increase of 1½ per cent. in the six months. This great loss was due to the drainage works of the city. In his opinion, the problem before the Company was how to stop this leakage, for it was costing something like £1500. Of course, they expected a loss of about 5 per cent.; but anything like 10 or 12 per cent. was out of the question. The consumption of gas had fallen off to the extent of about 2 million cubic feet, as compared with the latter half of 1899, owing to the adoption of incandescent lighting by the Corporation and some of the ordinary consumers, and also to the high temperature. He did not think there was anything very alarming in this. He moved the adoption of the report, in which the payment of dividends at the rates of £9 10s., £6 13s., and £4 15s. per cent. per annum on the three classes of stock was recommended. It was mentioned, in the course of the report, that at the works (which are under the supervision of Mr. R. Brown, the Engineer and Manager) the scrubbing plant had been altered and brought up to date, and that the remaining half of the second retort-house had been enlarged ready for the installation of inclined retorts. The report was unanimously adopted; and the dividends were declared. The Chairman remarked that they had no money with which to pay them; and though they were indebted to the extent of £10,811 to their bankers, they would have to borrow again. However, there was a sum of about £16,172 due for gas.

In the report presented by the Directors of the Chester United Gas Company at the half-yearly general meeting on Thursday last, they state that the increased demand for gas during the closing months of 1899 and the commencement of 1900 showed the necessity for increasing the means of gas manufacture; and they found it advisable to make a partial reconstruction of the existing retort-house, with the introduction of regenerative furnaces and other modern apparatus, as the most economical and suitable way of meeting the increased demand. A contract has accordingly been entered into with West's Gas Improvement Company, Limited, for carrying out the work. To provide the

required capital for this and future extensions, the purchase of additional lands, and for trading purposes, the Directors are promoting a Bill, the provisions of which were explained at the special meeting held for the purpose. Provision will be made in the Bill for the conversion and consolidation of the stocks of the Company. The accounts accompanying the report showed that 76,502,200 cubic feet of gas were sold within the city, producing a revenue of £12,398; 13,939,800 cubic feet beyond the city, bringing in £2260; and 4,372,000 cubic feet for public lighting, returning £782. The total receipts were £20,161; and the expenditure was £15,102—leaving £5059 to go to the profit and loss account. The balance available for distribution was £3555, and the Directors recommended the payment of the full statutory dividends on the ordinary stocks of the Company, which allowed of a small balance being carried forward.

At the annual general meeting of the Coatbridge Gas Company last Thursday, the Directors reported that the sale of gas in the six months ending Dec. 31 showed a continuous advance; the aggregate consumption having been 62,346,188 cubic feet, or an increase to the extent of 7·89 per cent. The number of consumers rose by 211, and of stoves, grillers, and fires lent on hire by 236. The gross revenue amounted to £12,757—being an increase of £2951; and the net profit was £2379. The amount chargeable against this for interest was £161; and the remainder, with the addition of the balance of £917 brought forward, made the sum of £3135 applicable to current dividends, &c. During the half year, £588 was expended on capital account. It was necessitated by the acquisition of ordinary and automatic meters, cooking and heating appliances, and extensions of pipes. The Directors recommended the payment of dividends at the rate of 10 per cent. per annum on the original stock, and 7 per cent. per annum on the new shares, less income-tax.

The half-yearly meeting of the Derby Gas Company was held last Thursday—Mr. H. Swingler presiding. In moving the adoption of the report and accounts, he said the Directors had recently received a quotation for coal, practically the same as six months ago. He, however, thought coalowners were making a great mistake in maintaining the current high rates; and the Directors had practically made up their minds to exhaust their present stock, which would last till about Midsummer, before entering into any other contract. In the meantime, he had no doubt reason would prevail, and they would be able to get coal at lower rates, though he did not think they would come down to the price of three or four years ago. He congratulated the shareholders upon the satisfactory state of the accounts, and adduced figures to show that the demand for gas continued to grow. In the aggregate, the Company had received £69,653 for gas during the year, showing an increase of £6511. In residuals there had been a very satisfactory year, the total increase amounting to £5473. Prepayment meters continued to show a very steady advance, and this accounted, with the cookers, for the increased consumption of gas in the town. In the course of last year they received from these meters alone an extra £1660, which was equivalent to 1,170,502 penny pieces, or 11 tons of coins. The total result of the year's working was that after the payment of dividends there would be a balance left of £3576 to go to the reserve fund, bringing this fund up to £18,778. Alterations and extensions would be made at the Litchurch and Cavendish Street works, and additional stock would be issued to provide for the outlay. With regard to their Engineer, Mr. Bell, he had been with them six months; and the Directors felt sure that what he was doing would prove very satisfactory. The report was adopted, and dividends of 10, 7, and 5 per cent. per annum were declared upon the respective stocks.

At the half-yearly general meeting of the Dorchester Gas Company to-day, the accounts to be presented show that the revenue in the past six months amounted to £4292, and the expenditure to £3190; leaving a balance of £1102. The sum available for distribution is £1178; and this is sufficient for the payment of the usual dividends on the ordinary and preference capital.

The annual meeting of the Durham Gas Company was held last Tuesday. For the half year ending Dec. 31 last the Directors recommended the payment of a dividend of 5 per cent. on the original and 3½ per cent. on the additional capital; making a total for the year of 10 and 7 per cent. respectively.

At the annual meeting of the Holmfirth Gas Company on the 23rd ult., the accounts presented showed that the net revenue from the sale of gas amounted to £3400, residual products yielded £1331, and the total receipts were £4876. The expenditure on the manufacture of gas was £2320; on distribution, £429; and on management, £410—the total being £3535. The balance of £1341 was carried to the profit and loss account, which showed a sum of £2089 available for distribution. A dividend of 8 per cent. was declared, and the temporary loan was reduced by £600. Under the supervision of Mr. Hubert Russell, the Company's Engineer and Secretary, 2099 tons 12 cwt. of coal were carbonized last year; the quantity of gas produced being 22,482,500 cubic feet, of which 20,300,300 cubic feet were accounted for.

At the annual meeting of the Launceston Gas Company on Monday last week, the Directors reported that the alterations and additions to the plant at the works had been completed, and that they were now enabled to meet the increasing demand for gas, as well as to improve its illuminating power. The high price of coal, which had continued throughout the year, compelled the Directors to raise the price of gas by 6d. per 1000 cubic feet from the 1st of April. They hoped that the state of the coal market would before long enable them to again lower it. They recommended a dividend of 6s. 6d. per share. The statement of accounts, which, with the report, was adopted, showed a balance of profit for the year of £674. The sum of £128 was transferred to the reserve account, which now stands at £2476.

At the half-yearly meeting of the Newport (Mon.) Gas Company on Monday last week, the Chairman (Mr. R. Laybourne, J.P.), in moving the adoption of the report and accounts, expressed regret that, though there had been a large increase in the make of gas, amounting to 11½ million cubic feet, in the six months ending Dec. 31, as compared with the corresponding half of the previous year, the cost of coal had been £5900 more. A unique incident in the abnormal price of coal was that sufficient offers could not be obtained in the Newport district, and coal had had to be brought from Lancashire by ship. The absurdity of carrying coals to Newcastle was an aphorism. The Directors had, however, found it necessary to bring coal to Newport; but he hoped the price would soon be lowered—indeed, there were already indications of the coming slump in prices—and that such a necessity as he had referred to would not arise again. In addition to the high price of coal, labour had gone up considerably. The sale of gas produced £5023 more; but this was in part due to the increase in price. The Directors knew when they made the increase that it would not be sufficient to cover the extra cost of coal; but they looked to the enhanced value of the residuals to cover the deficiency. In this expectation they had not been disappointed, as coke showed an increase of £1600. The finances were not in quite so flourishing a state, as the profit and loss account showed £7595 carried forward last half, against £6657 this half; but the Directors were able to announce the statutory dividends of 10, 7½, 7, and 5 per cent. for the year without having recourse to the reserve fund. Alderman Davis seconded the motion; and it was carried.

The accounts presented at the half-yearly meeting of the Town and County of Poole Gas Company yesterday showed for the past half year revenue to the amount of £5411, of which £3489 was produced by the sale of 15,517,400 cubic feet of gas to private consumers. The expenditure having been £4208, the balance carried to the profit and loss account was £1203. The sum available for distribution was £7434; and out of it the Directors were able to recommend the payment of the maximum dividends. In their report, they explained that the profit in the half year covered was less by £194 than for the corresponding period of 1899, which was more than accounted for by the increase in the cost of coal and labour; the former being an advance of 44, and the latter of 10 per cent. Additional storage has been provided in the form of a new gasholder, which was satisfactorily completed by Messrs. C. & W. Walker, Limited, towards the close of the summer, and has been in use since October.

The report of the Directors of the Pudsey Gas Company shows that during the past year the great advance in the price of coal caused some anxiety, particularly when gas companies and local authorities on every hand were increasing the charge for gas. They have, however, been able to keep the price as before—2s. 6d. per 1000 cubic feet—and the dividend has not suffered. The sales of gas have increased by 2·84 per cent. To prevent the supply being jeopardized, storage has been provided for 1000 tons of coal. An interim dividend at the rate of 8¾ per cent. per annum was paid in August; and the Directors recommend one at a like rate for the past half year.

The Sleaford Gas Company, Limited, will hold their annual general meeting to-day, when the Directors will report a net profit of £1498, after placing £500 to form a reserve, and recommend a dividend at the rate of 9 per cent. per annum, free of income-tax. Compared with 1899, the profit was higher, notwithstanding the greatly increased cost of coal, labour, and materials; and it was due to a reduction in the expenses of working, on which the Manager (Mr. Harry Wimhurst) is to be congratulated. There was a steady increase in the consumption of gas last year; the number of prepayment meters in use having gone up from 372 to 449, and of ordinary meters from 561 to 586. Unlike most other companies, the Directors did not raise the price of gas.

At the half-yearly meeting of the York United Gas Company last Thursday, the Directors reported that the balance of revenue account carried to profit and loss amounted to £3438. Adding £239, interest from the reserve fund, the total profit amounted to £3677. Of this sum, £189 had been paid for interest on money borrowed on mortgage; leaving £3488 available for dividends, amounting to £7400. This showed that the profit fell short of the sum required by £3912. But as this deficiency was fully anticipated by the Directors, and could be taken from the unappropriated surplus profits of previous years reserved for the purpose, they recommended that the usual dividends be declared of 5s. per share upon the original shares and those created in 1878, and of 4s. each upon the shares created in 1898. The expenses had been abnormally high; the extra cost of coal and oil alone having been no less than £3793 above the corresponding period of 1899. But this was not likely to occur again, as the abnormal prices were already falling. The business of the Company continued to make satisfactory progress—gas consumption showing an increase for the year of 4·21 per cent.; and had it not been for the extremely mild weather in December last, which very much checked the use of gas, the increase would have been much greater. During the past year, the Company had fixed meters for 518 additional consumers, including 294 prepayment meters; while very few users of the electric light had entirely given up gas. They had also fixed 14 gas-engines, varying in size from ½-horse to 20-horse power. To show the growing popularity of gas for domestic use, the Company during the year had put in 135 cooking-ovens and 367 gas-fires; these being in addition to cookers and fires fixed by other gas fitters. To meet the growing demands, additional mains had been laid, and others had been enlarged in various parts of the city. This work would have to be further extended during the current year. A scheme for facilitating the use and increasing the advantages of incandescent burners was being considered by the Directors, and they hoped shortly to submit it to the consumers. Mr. J. R. Hill, the Chairman of the Company, moved the adoption of the report, and supplemented the particulars contained therein by a few explanatory comments. He specially emphasized the importance of consumers changing faulty burners for the improved ones which have been put upon the market at a very low price, and by so doing getting the full illuminating value out of the gas. The report was adopted, the dividends were declared, and the Directors were authorized to raise further capital by the issue of 3000 ordinary shares of £10 each, bearing a maximum dividend of 4 per cent.

Water Companies.

The balance of the year's income of the Boston Water Company is £3370, of which £500 is to be carried to the reserve fund. From the balance a dividend of 9 per cent. is proposed.

At the recent half-yearly meeting of the Cambridge Water Company, the Directors reported that a mortgage of £3000 on the Cherry Linton Estate had been paid off, and the claims arising out of the fraudulent transactions of the former Secretary settled. The Engineer and Manager (Mr. W. W. Gray) in his report stated that the total number of houses supplied was 15,822, of which 171 had been put on

in the past six months. Dividends at the rates of 10 and 7 per cent. per annum were declared.

The half-yearly ordinary general meeting of the Chester Water Company was held last Thursday. The accounts for the six months showed a surplus of revenue over expenditure of £2545. There was a balance of £6760 brought forward; making a total of £9305, from which had to be deducted £574, the cost of the opposition to the Chester Rural District Council's sewage schemes, and £450 for interest on preference capital. The statutory dividends would absorb £1890; leaving £6391. The usual dividends were declared. In moving the adoption of the report, the Chairman (Mr. F. E. Roberts) alluded to the recent water scare in Chester, which, he said, had led to investigations and improvements. Mr. Davies, of Liverpool, and Professor Delepine, of Owens College, Manchester, inspected the works and made many tests on behalf of the Company. The Directors felt at the time that the difficulty was not due to any inherent defects in the works, but to the exceptionally rainy season. The latest reports as to the analyses of the water were very favourable.

The report of the Directors of the Cleveland Water Company, for the six months ending Dec. 31, which is to be presented to the half-yearly meeting on the 13th inst., shows that, after providing for all expenditure, there remains a balance of £5044. The Directors recommend a dividend at the rate of 9½ per cent. per annum on the original and "A" shares, and of £6 13s. per cent. per annum on the "B" shares, free of income-tax; also that £125 be reserved for contingencies. This will absorb £3355, and leave a balance of £1689 to be carried to the credit of the next account.

The business and finances of the Consett Water Company are making gratifying progress. The annual report discloses an increase of £1074 in the income; and the undivided profit, including £3371 brought forward, is £11,906. A dividend at the rate of 6½ per cent. per annum is proposed on the ordinary shares; making, with the interim distribution, 6½ per cent. for the year, with £4546 carried forward.

The Directors of the Great Marlow Water Company, Limited, have issued their statement of accounts for the past year. The revenue was £2063, against £1878 in 1899—an increase of £185. The expenditure was practically the same as in the previous year—£1038, against £1039. The balance on the revenue account was £1025, against £839 before. The Directors recommend the payment of a dividend of 7 per cent. on the original, and of £4 18s. per cent. on the additional shares.

The report of the Directors of the Pontypridd Water Company for the half year ended Dec. 31 states that, after payment of interest on debentures, and providing the usual dividends for the preference shares, there remains a balance of £4154, out of which they recommend a dividend at the rate of 7½ per cent. per annum on the original stock and the ordinary shares and £5 5s. per cent. per annum on the new ordinary share capital, subject to deduction of income-tax, absorbing £3645, and carrying forward £509.

The half-yearly meeting of the Truro Water Company was held last Tuesday. The Directors submitted the audited accounts for the six months ending Dec. 31, and recommended that a dividend at the rate of 5 per cent. per annum, amounting to £400, be paid out of the balance of £1127 standing to the credit of the profit and loss account. The Engineer (Mr. N. Trestrail) reported that the Worthington engine had run for 1174½ hours, and pumped 32,702,000 gallons of water; and the old engine 53 hours, pumping 954,000 gallons. The total quantity pumped by steam power was 33,656,000 gallons; the amount of fuel consumed being 138¼ tons. The water-wheel raised 1,862,000 gallons. The whole of the pumping plant was in a good state of repair, the efficiency of the engines was being maintained, and they were working satisfactorily. The report was adopted.

The report of the Weardale and Shildon District Water Company for the past year states that the net revenue amounts to £50,073, including £11,194 brought forward. The Directors recommend a dividend, clear of income-tax, of 15s. per share (making, with the interim distribution, 5½ per cent. for the year), appropriating £1000 towards the cost of rebuilding the Durham offices, £2500 towards the outlay for auxiliary and duplicate pipe-lines, and carrying forward £11,749. Filter-beds are being erected near the Tunstall reservoir. A large number of small extensions of pipes were made during the year, and an agreement has been entered into with the Sedgefield Rural District Council for a water supply, which will be available for the villages of Sedgefield and Bradbury.

The 74th half-yearly meeting of the Whitby Water Company was held last Tuesday—Mr. R. E. Parnett (Chairman) presiding. The revenue account showed, subject to outstanding liabilities, a disposable balance of £1636, out of which the Directors declared the following dividends for the half year: On the preference stock, at the rate of 3½ per cent. per annum; on the original shares, 8s. 6d. per share, or at the rate of 8½ per cent. per annum; and on the new shares (1897), 5s. 11¼d. per share, or at the rate of £5 19s. per cent. per annum. These payments, less income-tax, absorbed £1158, and left a balance of £478 to be carried forward.

The balance-sheet of the Yeadon Water Company for the six months ended Dec. 31, shows a net profit of £900, which, added to £271 brought from the preceding half year, makes £1171 available for dividend. The Directors recommend a distribution at the rate of 6 per cent. per annum on the original capital (1870), and £ 44s. per cent. per annum on the "B" stock (1889). This will absorb £1100, and leave a balance of £71 to be carried forward. There was spent on capital account during the half year £131; bringing up to £55,643 the total outlay on the works.

The revenue from the sale of water and the rental of meters by the York Water Company in the six months ending Dec. 31 amounted to £11,166; and the total receipts were £11,248. The expenditure being £3738, the balance carried to the net revenue account was £7510. The amount available for distribution was £9551; and at the meeting last Thursday the Directors recommended dividends at the rates of 5 and 3½ per cent. per annum on the preference shares, 10 per cent. per annum on the ordinary shares, and 7 per cent. per annum on the new shares. By the duplication of a large trunk main, a more efficient supply of water has been furnished to the north-eastern side of the city; and some of the smaller mains throughout the district have been enlarged.

GAS SUPPLY OF GLASGOW.

Lecture by Mr. A. Wilson, of Dawsholm.

Last Saturday, Mr. Alex. Wilson, Manager of the Dawsholm Gas-Works of the Glasgow Corporation, delivered a lecture on "The Gas Supply;" being one of a series arranged by the Corporation for the present winter in order to inform the community upon the services which the Corporation undertake for them. The gathering took place in the Berkeley Hall, and was presided over by Mr. R. M. Mitchell, the Convener of the Corporation Gas Committee. There was a very large attendance.

The CHAIRMAN, in briefly introducing Mr. Wilson, said the audience would be surprised to know the possibilities that lay in the future for the manufacture of gas for the city of Glasgow.

Mr. WILSON said it was now more than a century since a young Scotch millwright, Murdoch by name, while working at his trade all the hours he could see, for a wage of something under a pound a week, conceived the idea of catching and using the subtle essence of coal that makes so bright a flame and flicker on the domestic hearth. Difficulties, which we of the present day could neither imagine nor appreciate, he encountered and overcame. He at first used iron pots for retorts, converted old musket-barrels into piping, and tried all manner of experiments to purify and deprive the gas of its vile smell; and at last he had the satisfaction of using it for lighting his house and offices at Redruth, in Cornwall. Like nearly every other useful invention, gas had to fight its way through both ridicule and opposition. To people accustomed to lamps and candles, it seemed an impossibility to have light without a wick. Sir Walter Scott made merry over the idea of lighting London with smoke. In Glasgow, a rhyme was current to this effect—

> We thankful are that sun and moon
> Were placed so very high,
> That no tempestuous hand might reach
> To tear them from the sky.
>
> Were it not so, we soon should find
> That some reforming ass
> Would straight propose to snuff them out
> And light the world with gas.

However, there seemed to be as much reason as rhyme in the Glasgow folk, for they early saw the advantage of, and adopted, the new illuminant. In 1805, Mr. Lumsden, a bookseller, lighted his shop windows with gas made by a retort heated in his fireplace; and his example was followed by others. But these were only small installations. In 1817 it was thought that it would be of great benefit to the inhabitants of the city and suburbs of Glasgow if the streets and other public places were lighted by gas; and an Act of Parliament was accordingly obtained, giving statutory powers to "The Glasgow Gas-Light Company" for the purpose of producing "inflammable air" and other products from coal. The capital was £40,000. The first works were erected on the west side of Kirk Street, near the High Kirk. The gasholder, to contain 25,000 cubic feet, was then the largest in the kingdom. In September, 1818, the manufacture of gas was begun, and great was the excitement when the shop windows of Mr. James Hamilton, of No. 128, Trongate, were illuminated by the new and marvellous light. The first street-lamp was lighted on the 5th of September of the same year. Since that bold step, the demand for gas had increased steadily. In 1822 the Company had to go to Parliament for £40,000 more capital. In 1825 they required £25,000; and so rapid was the expansion of the new industry that again in 1826 they obtained £50,000. In 1835, in order to meet the ever-increasing demand, ground was purchased in Tradeston for additional works. These were erected and ready for use in 1838, and cost upwards of £20,000. To supply the needs of the "village of Partick," ground was also secured there, and another works erected in 1840. Previous to this time there had been grumblings and dissatisfaction among the consumers as to the quality and price of the gas. This culminated in 1843, when an opposition Company, "The City and Suburban," obtained an Act of Parliament to supply the inhabitants of Glasgow and the neighbourhood with gas. Their capital was £150,000, and they erected works at Dalmarnock on a larger scale than had been attempted by the old Company. Their receipts for the first year were £10,537; and the Company proved so great a success that in 1857 they had to apply for £50,000 additional capital. Still the increase went on. In 1869 both Companies required more money, and promoted Bills to obtain it. The Corporation, under Lord Provost Sir James Lumnsden, of Arden, seeing that gas was now almost as much a necessity of modern life as water, opposed these Bills, and promoted two of their own—one to authorize them to purchase the existing undertakings, and the alternative one to empower them to erect competing works. The result was that the House of Commons agreed that there should be only one management of the gas-works in Glasgow, and that the Corporation were the proper authority to undertake it. The shareholders of the Companies received for their stock perpetual annuities at the rate of 9 per cent. for the 10 per cent. maximum dividend stock. The mortgage debts of the two Companies were also taken over by the Corporation. The yearly make of gas had risen from 1285 million cubic feet in 1820 to 5969 million cubic feet in 1900. But the capital account had only increased from £532,317 to £1,408,621 in the same time. This had been accomplished by regularly depreciating the capital; the amount written off in the thirty years being upwards of £1,177,000. As a result, the Corporation had now a much more valuable property, in good order, equipped with the most up-to-date plant, and standing in the books at a very moderate valuation. The capital account per million cubic feet had fallen from £616 in 1875 to £235 in 1900. In London the average capital account per 1000 cubic feet was 9s. 9d.; in Glasgow it was 3s. 5d. The gross revenue per annum had risen from £235,700 to £770,000; but this had not kept pace with the manufacture of gas, which was mainly due to the reduction of the selling price from 4s. 7d. to 2s. 2d. per 1000 cubic feet. Several of the old works taken over by the Corporation were badly situated for gas manufacture, and extensions and renewals were

needed to meet the growing demand. Under the able management of their eminent Engineer, Mr. Foulis, the smaller works, with their inconvenient sites, entailing large outlays for the carriage of materials, had been given up; only the works of Dalmarnock and Tradeston being retained, as they were convenient to the railway system. New works had been erected at Dawsholm; the works and plant of the Maryhill Gas Company had been bought up; and now ground had been secured, and large new works were being erected, at Provan. In the manufacturing department last year, there were employed in all the works 4258 retorts and 2480 men; a sum of £141,770 was paid in wages; and 677,600 tons of coal and 500,000 gallons of oil were carbonized. In the meter department, 135 men, and in the gas-fitting department 260 men, were employed, with a total wages bill for the year of £30,550. Upwards of 200 men were engaged on the mains, with a yearly outlay for wages of £15,800. In addition to the men employed in the manufacture and purification of gas, a large staff was required for the maintenance and repair of the works. Besides the buildings and retort-benches to be kept in repair, there were the coal-breakers and elevators, the stoking machinery, over 40 stationary steam-engines, 5 large and 15 small locomotives, 8 steam-cranes, steam-pumps, scrubbers, purifiers, &c. They also repaired all their waggons, carts, and vans, and shod the horses employed in the works. For these purposes, they employed bricklayers, masons, fitters, turners, blacksmiths, painters, gas-fitters, plumbers, &c. There were altogether about 345 miles of mains, supplying upwards of 202,000 consumers. At the present time there were more than 1600 engines driven by Glasgow gas. The Corporation had at present about 20,000 cookers and fires out on hire; while there were, in addition, private heating appliances, consisting of cookers, gas-fires, tailors', machinists', and laundry hot-plates, heating apparatus in laboratories, &c., to the number of something over 44,000. About 1500 gas heating and cooking appliances were sold last year by the Corporation stove department alone.

In the course of the lecture, a large number of excellent views of gas-works arrangements and diagrams of plant were shown upon the screen. With regard to burners, Mr. Wilson had a stand on which were arranged specimens of different kinds, from the original rat-tail to the modern incandescent. These he lighted in turn, to illustrate his remarks, which were directed to showing how consumers might exercise economy in the use of gas. He had, he said, four old burners, which he had collected from consumers. By one of them, supposing they were getting £1 worth of light from a standard burner, they would only get 13s. 6d. worth; by another, only 13s. 9d. worth; and by another the illumination would be less than 10s. worth for the same quantity of gas. He lighted four incandescent burners, and said that while they were together consuming about the same quantity of gas as one of the bad burners, the illumination was as 230 to 15 candles.

Bailie CLELAND moved a vote of thanks to Mr. Wilson for his lecture.

Mr. WILSON having returned thanks,

Mr. W. FOULIS said he thought they had had a very excellent lecture from Mr. Wilson. He imagined that the part which would be of most interest to the audience would be that which related to the proper method of consuming gas. There could be no doubt whatever that in all cities a very great deal of gas was simply absolutely wasted, because it was consumed with burners which were quite unsuitable for it. It would be too tedious were he to give them a theoretical explanation as to why each different quality of gas required a special kind of burner to consume it properly; but it was the case that, unless the burner was suitable for it, a very great deal of light was wasted, which, of course, meant waste of gas. There could, he thought, be no doubt that the method of burning gas in the near future would be by means of incandescent mantles. In some towns on the Continent, already more than 90 per cent. of the gas was consumed by incandescent burners. A flat-flame burner was, in fact, a rarity; and he was quite certain that this would be the case in our own country in a short time. He proposed a vote of thanks to their worthy Chairman, the Convener of the Gas Committee, and said he was sure they would gladly accord to him that vote, because he was at the head of a large concern, in which he took a very deep interest.

The CHAIRMAN, briefly acknowledging the vote, said he did not accept it entirely for himself; he took it to be a mark of their approbation of the work of the whole Gas Committee. He thought that, after what they had heard, they would believe that there was some work done by the Committee; and he made bold to say that they had all done their best for their fellow-citizens.

Ripon Water Supply.—At a recent meeting of owners and ratepayers of Ripon held under the presidency of the Mayor (Mr. J. Spence), a formal resolution was submitted by him sanctioning the promotion next session of a Bill authorizing the Corporation to construct additional water-works, and for other purposes. Alderman A. Wells (Chairman of the Water-Committee), in seconding the motion, remarked that the matter had been practically forced upon the Corporation. They had no intention at present of carrying out further water extensions, as it was well known to the ratepayers that they had an ample supply, and one that would suffice for some time to come. At the same time they felt they were justified in looking ahead. They thought they had as much right as their neighbours, Leeds and Harrogate, to secure a supply of water that would be equal to the demands of a very much larger population than they at present possessed. They were depositing their Bill now because Leeds had come into the district, and wanted to annex every available drop of water they could get hold of. They were not only going to tap one of the chief tributaries of the Ure—the Burn—but were taking the whole of the waters of the Skell and the Laver. They thought in Ripon that they should not allow the Leeds people to take away water which they practically looked upon as part of their watershed without a little fight. He was sorry he could not unfold the scheme. As a Committee, they were somewhat tongue-tied, for they had a very strong opposition from Leeds to combat. They were advised that they had a very good case, and that no Parliamentary Committee would allow their old city to be blocked out entirely, even for a large and wealthy city like Leeds. The motion was carried with three dissentients.

METROPOLIS GAS SUPPLY.

The London County Council and Proposed Gas Legislation.

The Parliamentary Committee of the London County Council have prepared a long report on the Bills of the Gaslight and Coke and South Metropolitan Gas Companies, and it stands upon the *agenda* for to-day's meeting. They begin by pointing out that the first-named Company promoted Bills in the last two sessions of Parliament for increasing their capital powers, and they were rejected; the Chairman of the Committee on the Bill of last session explaining that one of the reasons for their decision was that its provisions had "obviously not been drafted with any intention to meet the recommendations of the Select Committee of 1899." They go on to say that the present Bill is again a financial one; its two principal proposals being the issue of £1,000,000 of 3 per cent. debenture stock, to rank after the Company's existing 3 per cent. debenture stock, and the establishment, out of divisible profits, of a redemption fund to extinguish obsolete capital. Dealing with these proposals, the Committee show, first, that the issue of the stock would, in the event of the sale of the Nine Elms works to the South Metropolitan Gas Company, place the Company in possession "of cash and capital powers" to the value of possibly £2,700,000, which would be sufficient for a period of at least twelve years, whereas the Select Committee of 1899 recommended that gas companies should not be granted capital powers more than sufficient for five years. They next illustrate the effect of the redemption proposal, the benefits to be derived by the present consumers from which they say would be "infinitesimal." It is remarked that the Company entirely ignore the recommendation of the Select Committee as to a revision of the sliding-scale, which, from the consumer's point of view, is the most important one, and that "there is nothing in the Bill which will effect a reduction of the present excessive charge for gas to a reasonable figure, or materially assist towards that end." The Committee next deal with the South Metropolitan Bill. With reference to the proposed acquisition of the Nine Elms works, they explain the legal position, and say that "steps must be taken to safeguard the interests of the Local Authorities north of the Thames." As to the other proposals—to raise additional capital and alter the auction clauses—they remark that "there does not appear to be any necessity for the increased capital powers apart from the proposed purchase of the area south of the Thames; and this does not apparently require more than £1,000,000." With regard to the other proposal, the Committee say it is open to grave doubt whether it could be relied upon, as against free public competition, to secure the highest price for the stock. In considering these Bills, the Committee have not only had due regard to the recommendations of the Select Committee of 1899, but also to the decisions of the representative conferences of Local Authorities convened by the Council and the Corporation of London last October. These are duly set out in the report, which concludes with a notification that the Council will be asked to-day to vote on motions in favour of both Bills being opposed, and an expression of opinion that the facts presented show the necessity for such a step.

ILLUMINATING POWER OF LONDON GAS.

Tests by the County Council's Portable Photometer.

The following is the text of the report of the Public Control Committee of the London County Council on the above subject, to which reference was made in the "JOURNAL" last week (p. 356):—

We submit in tabular form the results of the testings made with the Council's portable photometer of the illuminating power of the gas supplied by the Gaslight and Coke, South Metropolitan Gas, and Commercial Gas Companies during the year 1900. [See next page.]

Table I. shows that the total number of testings made was 187, 131 of which were below 16 candles; 99 of these, or 53 per cent. of the total number of tests, being below 15·5 candles. These results show some improvement in the illuminating power of the gas as compared with the results obtained during 1899. The percentage of testings below 16 candles during 1899 was 90, whereas during last year the percentage was only 70.

In Table II. we have set out the results obtained in the latter half of the year in the same manner as those for the entire year. On comparing the two tables, a decided improvement in the illuminating power of the gas after the end of June will be at once apparent. During the period between the 1st of July and the 31st of December, 1900, 55 testings of the gas supplied by the Gaslight and Coke Company were made, and on no occasion was the illuminating power of the gas found to be below 15 candles. In that portion of the East-end of London supplied by the Commercial Gas Company, the illuminating power of the gas was tested on 14 occasions. These testings were made principally during the month of November, when the output of gas by the Companies is very large. Notwithstanding this, on no occasion during the period was the illuminating power of the gas below 16 candles. The highest result obtained was 17·8 candles, and the lowest 16·1 candles; the average of all the testings being 16·8 candles, or nearly one candle above the standard required by the statute.

The increased illuminating power of the gas during the latter half of the year is shown by the increase in the percentage of testings above 15·5 candles as compared with the first six months of the year; and the decided improvement in the illuminating power of the gas supplied by all the Companies during the latter half of the year 1900 is also shown by comparing the average of the first half of the year with that of the last six months. The actual figures are:

	Average for First Six Months. Candles.	Average for Last Six Months. Candles.	Increase. Candles.
Gaslight and Coke Company . . .	15·0 ..	15·9 ..	0·9
South Metropolitan Gas Company . .	14·2 ..	15·7 ..	1·5
Commercial Gas Company	14·0 ..	16·8 ..	2·8

With regard to the testings made with the portable photometer in the district supplied by the Commercial Gas Company during the six

months ended the 31st of December, it is remarkable how close an agreement there is between these testings and the testings made at the fixed testing-places on the same days. The average of all the testings at the Old Ford and Wellclose Square testing-places (the only two in the area supplied by this Company) was 16·9 candles; while the average of the testings made on the same days with the portable photometer was 16·8 candles. From these results, it would appear that the gas supplied on the days when the testings were made had the same illuminating power in all parts of the Company's district. These results go to prove that when testings are made at places other than the fixed testing-places with a portable apparatus of precisely the same character as that in use at the fixed testing-places, and with gas of the same illuminating power, the results obtained outside are in agreement with those obtained within the testing-places.

It is satisfactory to know that there is some improvement in the illuminating power of the gas supplied to London during the past half year; and it is to be hoped that the improvement will continue. To what extent the action taken by the Council immediately before the improvement occurred has led to the supply of gas of higher illuminating power throughout the districts surrounding the fixed testing-places, it is difficult to decide.

TABLE I.—*Results of Testings with the Portable Photometer during the Year* 1900.

Tests showing Illuminating Power of the Gas to be—	Gaslight and Coke Company.		South Metropolitan Gas Company.		Commercial Gas Company.	
	No.	Percentage of the Whole (Approx.).	No.	Percentage of the Whole (Approx.).	No.	Percentage of the Whole (Approx.).
Above 16 candles.	33	32	9	17	14	42½
Between—						
15·5 and 16·0 candles	25	25	6	11	1	3
15·0 ,, 15·5 ,,	25	25	8	15	4	12
14·0 ,, 15·0 ,,	13	13	15	28	3	9
13·0 ,, 14·0 ,,	5	5	13	24½	8	24
12·0 ,, 13·0 ,,	..	..	2	4	2	6
11·0 ,, 12·0 ,,	..	..	..	..	1	3
	101		53		33	
Averages . .	15·6 candles.		14·8 candles.		15·1 candles.	

The total number of testings made during the year was 187, of which 131 were below 16 candles; 99, or 53 per cent., being below 15·5 candles. During the year 1899, the total number of testings made was 200, 90 per cent. of which were below 16 candles, and 72 per cent. below 15·5 candles.

TABLE II.—*Results of Testings with the Portable Photometer during the Six Months ended Dec.* 31, 1900.

Tests showing Illuminating Power of the Gas to be—	Gaslight and Coke Company.		South Metropolitan Gas Company.		Commercial Gas Company.	
	No.	Percentage of the Whole (Approx.).	No.	Percentage of the Whole (Approx.).	No.	Percentage of the Whole (Approx.).
Above 17 candles .	..	..	..	..	4	100
Above 16 candles .	32	58	9	45	10	
Between—						
15·5 and 16·0 candles	14	25	6	30	..	..
15·0 ,, 15·5 ,,	9	16	3	15	..	..
14·0 ,, 15·0 ,,	..	..	1	5	..	..
Below 13 candles. .	..	..	1	5	..	..
	55		20		14	
Averages . . .	15·9 candles.		15·7 candles.		16·8 candles.	

The total number of testings made during the six months ended the 31st of December was 89, of which 34 were below 16 candles, only 14 of these being below 15·5 candles.

MR. STELFOX ON THE PREPAYMENT METER SYSTEM.

A few weeks ago, Mr. James Stelfox, Gas Engineer to the Belfast Corporation, presented to the members of the Gas and Electric Lighting Committee a report on prepayment meters. The matter has recently been before the Town Council, so we are able now to give the report, which, in view of the position occupied by Mr. Stelfox, will doubtless be perused with special interest.

It has been suggested that a number of householders who at present are not gas consumers would become so if the system of prepayment meters, which has been so largely introduced in many towns, were exploited here. It must be admitted that the coin-freed meter is a more honest machine than most of the automatic contrivances, inasmuch as its errors of omission and commission are capable of correction by the regular index, which in all cases is referred to as the Court of Appeal, so that undercharges and overcharges are adjusted by comparison of the gas represented by the coins found in the cash-box and that indicated on the index. Nevertheless, this capability of correction tends to a great deal of friction if the error should be one involving a supplementary payment on the part of the consumer. So well is this understood, that I know of at least one case in which the automatic arrangement is purposely set a little slow, so that at every term there is a penny or two in excess of the actual consumption to be handed back to the consumer; while, on the other hand, there have been many cases in which consumers have refused to pay up when the error was on the other side, and legal measures have sometimes had to be resorted to for the recovery of the shortage. Mr. Helps, of Croydon, this year's President of the Incorporated Institution of Gas Engineers, who has had special experience on the subject, in his Presidential Address, said: "The discrepancies which arise are somewhat delicate to deal with; and the fact that they do occur renders it almost impossible to keep a satisfactory check on the collectors."

That the increase in consumers has been very great in some instances is admitted. That the increased consumption is very profitable does not seem quite so apparent. In the address already referred to, Mr. Helps goes elaborately into the various classes of consumers, and shows that while the "automatic" customer is usually a much less profitable one than the ordinary, he may become a source of actual loss, notwithstanding the extra price of gas with which he is charged.

It is universally admitted, I believe, that for the ordinary small consumer, using two or three lights only, the automatic system would be a dead loss. Therefore in all cases when the system is adopted, in addition to branches for lighting purposes, boiling-burners, grillers, or cooking-ovens are provided, for the purpose of tempting the customer to use gas for boiling and other culinary operations, and thus run up a considerable gas bill, so as to give a return for the expensive installation of apparatus and the increased cost of wear and tear and supervision. The gas is usually supplied at 8d. to 10d. per 1000 cubic feet above the ordinary selling price, so as to afford an extra margin of profit against this extra expense. But though appliances may be provided for burning gas, the householder cannot be compelled to use them; and, if not used, they become a mere obstruction in a small apartment, affording neither convenience to the tenant nor profit to the gas undertaking.

In most of the English towns where the system has been introduced, the wives of the smaller householders are, as a rule, well up in cottage cookery, and in many cases, if not generally, also bake their own bread. Where this is the case, a gas-cooker may be economically employed. It would not, however, be economical to light a burner to boil a kettle in a room where an ordinary fire is alight. I fear that in Belfast the use of the gas-cooker for the first purpose would not be largely availed of; and I could not recommend the second unless the convenience of an early morning cup of tea would be a set-off against the loss of gas. I am, in fact, disposed to think that we should have no adequate return in extra gas sold for the very large outlay involved in the exploitation of the automatic system.

There are, to my mind, many objections to the system, some of which I may just refer to without wishing to unduly magnify them, and not forgetting that in many places these have not been considered of sufficient gravity to prevent its introduction. The price of a small slot meter (I assume that only small meters would be required) is about double that of an ordinary consumer's meter. The complication involved in the automatic appliance would much more than double its chances of disarrangement. Therefore wear and tear may be reckoned on the increased cost at a higher percentage than rules with the ordinary meter. The cost of fixing such a meter and providing the usual apparatus for a small house varies from £3 to £5 or £6; the former sum covering only a bracket or two and a boiling-ring, while if a cooker is provided the cost will run up to the latter figures. Interest and wear and tear on this would amount to nearly as much as the gross amount of the average small house gas bill.

I have already referred to the difficulty of dealing with discrepancies between cash-box and index, so merely recapitulate it here.

Another cause of trouble arises from the temptation to procure a gas supply by the use of discs or stampings instead of pennies. Of course, this can only have effect until the collector comes round; but it affords another source of friction, and has in many instances had its sequel in the Police Courts. The robbery of the cash-box, either by the depositor or someone else, is likewise often the cause of prosecution in the Criminal Courts. This trouble seems to be very common. The cases brought into Court are of constant recurrence; and the Secretary of one of the largest communities informs me that the offence is a great annoyance to them, and that it is very difficult to obtain sufficient evidence to secure the conviction of the offenders.

With any change of price of gas, the automatic appliance of each meter must be re-adjusted. The operation is, in many of the "slots," not a difficult one when the meter is on the bench, but the alteration of a large number in use would be a serious matter.

Many ordinary consumers have been found desirous to change to "automatics" when the opportunity presented itself. Possibly this may have arisen from the novelty of the thing; and there does also seem to exist a sort of fascination in obtaining things by the insertion of a coin, and pulling or turning a handle, otherwise so many people would not go away contented with—if fortunate—halfpennyworths for which they have exchanged their pennies. I should regard every such change of consumer as a loss to the undertaking, notwithstanding the higher rate at which the gas was paid for.

The inspection of the meters and checking the cash with the index and making the needful adjustments would prove a work of some difficulty, though clearly this has been overcome by experience which would doubtless be available for us. I do not think, under any circumstances, a small experiment would be of any use. If undertaken, it should be on an unlimited scale—by that I mean that everyone who wants a slot meter should have one—and a special sub-department organized to work it. The collector of the pennies should not, in my opinion, be the taker of the indices. On such points, however, I have no doubt that we could depend, as in the matters already referred to, upon having the benefit of the wisdom and experience of others.

Having mentioned a few aspects of the question as they occur to my mind, I revert to what is, after all, my chief reason for hesitating to advise you to adopt the system, which I may summarize in these few words: It will involve a very large outlay to provide meters and stoves for small consumers; it would be useless and a loss to fix the former without the latter; and it would be a still greater loss if, the stove having been fixed, it was left unused. The last is the contingency which I most fear; but as each of you will have just as good opportunities of judging as myself, the question must wait for your decision. All I can say is, that if you determine to introduce the system, I shall see that every effort is made to ensure, if possible, its success.

THE LONDON COUNTY COUNCIL AND SUBWAYS.

At the Meeting of the London County Council last Tuesday—Mr. W. H. DICKINSON in the chair—the question of the general provision of subways in the Metropolis was under consideration, on a motion placed upon the *agenda* by Mr. R. Parker on the 16th of November last, as noticed in the "JOURNAL" at the time. It was in the following terms: "That, to mark the importance of the addition to the civic interests of the Metropolis by the creation of the new Borough Councils, it be referred to the General Purposes Committee to consider the best manner of bringing before those Councils the imperative necessity of making subways under at least all the leading thoroughfares of the Metropolis, to contain all the gas and water pipes and telephone and telegraph wires; and, if necessary, to summon a conference to formulate some comprehensive scheme for remedying the scandalous and ever-increasing inconvenience to pedestrian, omnibus, and mercantile traffic caused by the constant tearing up of the footways and roadways for the purpose of inserting or removing the pipes, wires, &c., above referred to."

Mr. PARKER, in moving his resolution, said the condition of the streets at the present juncture, and for a long time past, constituted a grave public scandal; and the highest personage in the land had recognized that this was one of the pressing problems in London. It had been said that this question was too large to be dealt with—that the complications were so many and the cost would be so great that it was absolutely impossible to deal with it. He did not take this view at all. He saw recently figures given by the "Daily Mail" with regard to the amount of money spent in five years upon the opening of the streets; and he believed £10,000,000 was mentioned. If so large a sum as this had been laid out—say, £2,000,000 annually—surely the money could be employed to better purpose by having proper subways formed through all the leading thoroughfares, and a charge made to the users of them which would very materially help to reduce the cost, and also in the end to make them pay for themselves. His view was that a public department should be formed for the purpose of dealing with the streets. He did not see why the London County Council, the City of London, the Westminster Borough Council, and most of the Local Authorities, should not join, and create such a public department. This would materially reduce the expense, and tend very largely to the improvement of the districts of London. This matter was a public scandal, and it was quite time the County Council took it in hand. He therefore suggested that the General Purposes Committee should take the question into consideration and convene a conference to see what really could be done with the authorities concerned.

Mr. J. ALLEN BAKER, in seconding the motion, remarked that figures had recently been published by Sir John Wolfe Barry, who had made an estimate, not of the cost of breaking up the streets, but of the time he considered was lost owing to the delay and congestion of traffic through the taking up of pipes, &c. Basing his figures on the small sum of 4d. per hour, he calculated that between £2,000,000 and £3,000,000 represented the time lost in this way. This showed that, wherever it was possible, they should carry subways under the main thoroughfares, and avoid opening the roads. In the Strand and Fleet Street particularly it seemed to him that it was absolutely essential that something should be done. Over and over again they had outcries in the papers that these streets were constantly being ripped up; but when once shallow subways, with conduits for pipes and mains, were laid, this trouble would be overcome for all time.

Mr. PARKER said the Vice-Chairman of the Council had suggested that he should somewhat amend his motion by leaving out all the words after "that" in order to insert "it be referred to the General Purposes Committee to consider the best manner of bringing before the new Borough Councils the imperative necessity," &c. This he accepted.

Mr. BAKER concurred.

Dr. LONGSTAFF supported the motion, and welcomed the suggestion that a conference should be summoned to formulate some comprehensive scheme. This would enable the matter to be dealt with on broader lines. It appeared to him that the first thing they had to do was to go to the Legislature with two objects. The first should be to insist that all companies who had power to break up roads should, in the case of big works, give the Local Authorities very much longer notice than they now gave. He saw no reason why they should not give notice of their intention to break up the streets at least six months in advance. If they had to give the notice he had indicated, there would be time for the different authorities to arrange that the various works be carried out simultaneously. The second object would be to compel the companies to go into the subways when they had been constructed.

Mr. HOWELL WILLIAMS pointed out that, taking Hammersmith, for instance, the Post Office had expended as much money in opening the road twice as would have been sufficient to pay for making a large subway in Hammersmith. The ratepayer was already much overburdened; but if the Council had authority, under Act of Parliament, to construct subways, he thought they could compel the great companies who now had power to open the roads to pay a very substantial amount towards them in addition to the rent, because it was notorious that they now spent thousands of pounds every year in opening, filling in, and re-opening the roads. They were all agreed that something must be done; and therefore they must make a start. This motion was in the right direction, and so he most heartily supported it.

The motion was then put, and carried unanimously.

Before the ordinary business of the Stockport Town Council was proceeded with last Wednesday, a special meeting was held to confirm a resolution previously passed that the Council apply to Parliament for a Bill authorizing the construction of water-works at Kinder Scout. Notwithstanding the warm opposition of three councillors (one of whom said the scheme would cost £803,000), the resolution was carried by 38 votes for and 6 against. Subsequently the result of a poll of the ratepayers on the question was made known, amidst applause; the figures being: For the scheme, 5598; against, 4749.

SUNDAY LABOUR IN GAS-WORKS.

We have received from the Secretary of the Lord's Day Observance Society (Dr. Frederic Peake, M.A.) the following circular, inviting the earnest co-operation of gas engineers and managers in the reduction of Sunday labour:—

The tone of the discussion on Sunday labour at the conference of gas engineers in Southport last November,* has been very encouraging to my Committee, who, for thirty years past, have taken an active part in the movement for diminishing Sunday labour in this department of industry. The importance of such conferences and of such discussions as the one referred to, in calling attention to remediable evils, and in securing the practical support of business men, may be illustrated by two examples which have recently come under my own notice.

Among the members of the Paris Congress on Weekly Rest, held under the auspices of the French Government, in connection with the Exhibition of 1889, was Monsieur A. Clermont, General Manager of the Liège-Maestricht Railway, in Belgium. He told me, at the Brussels Congress in 1897, that he was so much impressed by what he heard in Paris, that he resolved to try the experiment of weekly rest (practically of Sunday rest) on his own line of railway. In the course of eight years, the Sunday goods traffic on that and on other Belgian lines had been reduced to 18 per cent. only of what it had been at the beginning of the period; and that with advantage rather than injury to the business interests of the Companies.

Another instance of a successful experiment, arising from the same congress of 1889, was reported at the recent congress, of a similar character, held in connection with the Paris Exhibition of 1900. Monsieur F. Honoré, Managing-Director of the Grands Magasins du Louvre and of other gigantic business enterprises, gave a striking account of his successful efforts to secure Sunday rest for the employees of the Company. He has put an end, almost absolutely, to the Sunday opening of that popular establishment, and to the Sunday delivery of its parcels, to the entire satisfaction of his Directors, his staff, and his customers. And that in Paris! He also expressed his obligations, in the management of this difficult and delicate reform, to the Popular League for Promoting Sunday Rest, which was formed to give practical effect to the resolutions adopted by the congress of 1889.

These instances of the successful co-operation of theoretical philanthropy with business capacity to extend the practical application of the principle of Sunday rest, may well encourage those gas engineers who were present at the Southport congress, or those who have read Mr. Shadbolt's admirable paper, to make a resolute attempt to secure for their own employees the immense boon and advantage of relief from Sunday work.

A distinguished and successful Gas Engineer has briefly and pointedly summarized the conditions set forth in detail in Mr. Shadbolt's paper, and in similar ones already issued by my Committee. He is my authority for saying that, to secure for gas workers a maximum of relief from Sunday work, but three things are essential: (1) Modern plant and methods, (2) sufficient storage room, and (3) good-will on the part of the managers. The last of these requirements, whether proceeding from humane disposition or from religious conviction, cannot but be stimulated by such public conferences as those recently held at Southport and in Paris.

As regards the two previous requirements, those with whom it rests to supply them may well be invited to consider the statement made by the Chairman of the half-yearly meeting of the South Metropolitan Gas Company on Feb. 16, 1898: "The item of carbonizing wages had now fallen (from 3s. 6d. a ton) to less than 2s. 3d. He attributed 3d. a ton of this decline to the better working of their men. . . . This, however, left a good shilling a ton to account for, and the decline to this extent in their carbonizing wages was attributable to improved methods of manufacture. Within the last five years they had expended £100,000 in alterations and improvements, and in the adoption of machinery; and he thought they would agree with him that an outlay of £100,000 to bring in a return of £45,000 a year was very satisfactory. The last-mentioned sum represented about 1s. a ton of the amount they had saved in their carbonizing wages."

If the means best fitted to promote Sunday rest agree thus closely with those whose adoption procured better financial results, there ought to be little difficulty in securing that "good-will on the part of the managers" which is the remaining essential element in achieving the desired reform.

MANCHESTER CORPORATION GAS AND WATER SUPPLY.

Alderman Gibson's Motion Again Postponed.

At the Monthly Meeting of the Manchester City Council last Wednesday, the minutes presented by the Gas Committee (which were adopted without amendment) included the acceptance of a tender for taking down and removing a gasholder which is no longer required at Rochdale Road. The Committee have further intimated their intention to recommend, at the next meeting, advances in the salaries of various officials. Alderman Gibson's adjourned motion with regard to the allocation of gas profits was, as mentioned last week, to have come up for consideration; but the discussion of this and other business that remained undisposed of at the close of the sitting was deferred to a special meeting to be held next week.

The minutes of the Water Committee were also presented. In moving their adoption, Sir John Harwood referred to an item in which the Committee recommended the provisional acceptance of a tender for cast-iron pipes in connection with the second line from Thirlmere. He said they had received authority to proceed with this work some time back. But when they came to inquire as to the price of iron pipes, they were impressed with the enormous cost; and though it was risky to delay matters, they felt they would have to take some responsibility,

* See "JOURNAL," Vol. LXXVI., p. 1329.

and they had deferred obtaining tenders until quite recently. They would require, in all, 50,000 tons; and the tender under discussion, which reached them during the previous week, was for 15,000 tons. According to the estimate for this quantity that had been received, the amount saved on the 50,000 tons, calculating the price on the same basis, would be £70,000, when compared with what would have been the cost six months ago; and it was possible that further tenders might be submitted on still more favourable terms. Of course, nothing—not even seventy times £70,000—would justify them in so delaying matters that the city would be short of water; but, under the circumstances, the Committee had done what they considered best. He hoped they would now proceed energetically; and there was this consolation, that when they had spent, as would probably be the case, £250,000 for pipes, £150,000 on labour, and £50,000 for wayleaves, there would be no necessity—at any rate, this was hoped—for increased taxation.

DUDLEY AND THE MOND GAS SCHEME.

At last Tuesday's Meeting of the Dudley Town Council, Alderman Claughton, in moving the adoption of the report of the General Purposes Committee, made an interesting statement with regard to the proposed introduction of Mond gas into the district. He remarked that the Committee were very much impressed with the necessity of something being done scientifically for the production of cheap motive power in the district—especially in the Black Country, some parts of which were in danger of being altogether snuffed out from an industrial point of view. Competition was becoming so keen that, unless some scientific use were made of their few remaining opportunities and advantages, he feared that manufacturers in the district would be left behind altogether, and have very great difficulty in meeting their engagements in the future; while the troublesome problem of finding work for the vast army of unemployed would become more difficult of solution. This view was held by some of them, and very strongly by himself—especially after seeing what was being done in competing districts, and in the United States. He had joined a certain Syndicate for carrying through Parliament this session a Bill having for its object the introduction of Mond gas into the district. The great idea in view was to use the inferior fuel of the locality for the production of a first-class power gas, the cost of which would be about one-third or one-fourth that of ordinary gas. They asked for no monopoly from Parliament, but simply that they might be allowed to make their experiment. They were, of course, being opposed by gas companies, municipalities, and various other bodies; but they trusted that when they had more thoroughly realized the position, they would find that the opposition was in every sense of the word hostile to their own interests. He took it that the true interests of gas companies and municipalities were in the progress and industrial success of the district as a whole, and not in some little profit or loss on the sale of gas for engines. The legitimate object of the gas companies was lighting, and they ought not for one moment to stand in the way of what would be a great public benefit. When they looked at the advantages other districts had in the shape of cheap electricity, produced by water power and cheap coal, they were almost in despair as to what was to become of their own district, especially of such a place as Tipton, with its water-logged mines; and it was only by the introduction of scientific inventions that there was any way out of the dilemma. He felt that if the proposal of the Company was rejected, it would be another nail in the coffin of a worn-out district. He, therefore, asked the Council to set a good example by favouring a great public work such as that which would be undertaken by the passing of the Bill. The Committee did not ask the Corporation to oppose the Bill, but to obtain certain terms by which all mains and pipes should be laid to the satisfaction of the Council. He was in the awkward position of having a pecuniary interest in the matter, and of being Chairman of the General Purposes Committee; but he could assure the members that he asked for the support of the Council on purely public grounds. In reply to questions, Mr. Claughton said that the cost to large consumers would be 3d. per 1000 cubic feet, but Mond gas did not go so far as ordinary gas. The proportion was about four to one, and brought the cost down, all things equal, to 1s.

LEATHERHEAD GAS BILL.

Withdrawal of Local Opposition.

At last Tuesday's Meeting of the Leatherhead Urban District Council, the Lighting Committee reported that they had been advised to oppose the Gas Company's Bill, for the purpose of protecting the Council's interests; and they recommended that the following amendments should be inserted in the Bill: (1) That the maximum dividend allowable on the capital should be 5 per cent. (this was equal to 10 per cent. on the capital of the Company in its unconverted state about three years ago), with a sliding-scale allowing the Company to increase its dividend by 5s. per cent. up to 8 per cent. in consideration of every reduction of 1d. per 1000 cubic feet in the price of gas; (2) the standard price of gas should be 4s. 4d. net per 1000 cubic feet of gas; (3) under section 55 the price of gas to all consumers for private lighting purposes should be the same, the Company, however, to be at liberty to make special contracts to supply gas for motive power; (4) that a clause should be inserted to protect consumers against the inefficient working of the slot meters, and any overcharge consequent thereon; (5) that the local authority should be entitled to be heard before any regulations under clause 61 were confirmed by any Government department; (6) that a testing-place be provided; (7) that the test should also extend to the presence of sulphuretted hydrogen; (8) why was it desired to increase the capital to £40,000, and what expenditure did the Company anticipate to cause this expenditure? On behalf of the Company, the Chairman (Mr. F. Hue Williams) wrote that, in consideration of the Council giving its support to the Bill by a resolution, he confirmed what had been agreed to by the Committee. (1 and 2) That they would accept 5 per cent. dividend, with a sliding-scale of 5s. per cent. for every 1d. reduction below the standard price of 4s. 4d. (3) The Company was to be at liberty to make liberal discounts to large consumers, provided it did not knowingly sell below cost price. (4) Clauses should be inserted in the Bill to protect slot consumers. (5) On this point the Company would give way unless its Parliamentary Agent showed good reasons for not doing so. (6 and 7) On these points the Company agreed to meet the wishes of the Council providing the expense was not great—say, from £10 to £20. (8) The nominal capital of the Company to remain at £40,000. In conclusion, the writer said he would do all in his power to see the agreement carried into effect. The Chairman remarked that, the Committee having agreed on these points, the Council had no intention of opposing the Bill. He thought the arrangement was a satisfactory one to the ratepayers and consumers, and also to the Council. The public were to be congratulated on the manner in which the thing had gone through. Mr. Howell moved the adoption of the report, and said he thought a very fair give-and-take arrangement had been come to. The resolution was carried, as was another to the effect that the Council should not oppose the Bill.

SULPHATE OF AMMONIA MARKET IN 1900.

A French View.

Commenting on the above matter in a recent issue, "L'Engrais" remarked that there was a slight increase in the world's production of sulphate of ammonia in the past year. For some time the chief markets—France, Belgium, and Germany—have taken less from England, the country which governs prices in all the markets. Logically prices should have fallen in 1900; but they did not—at least in the spring, when they advanced. This anomaly is explained by the great facility England possesses for selling elsewhere what France, Belgium, and Germany no longer buy. The demands in Spain, the Colonies, and the United States have of late augmented perceptibly; and this has more than compensated for losses caused by the above-mentioned three countries. The present year opens with the full prices of 1900 at the same period for English sulphate. There may be a very moderate inquiry in France, Belgium, and Germany during the spring; but it remains to be seen whether the demands in other places will compensate for a feared deficit. Lassitude is particularly conspicuous in France, for Paris prices for home products are now, so to speak, at the same level as those of English sulphate at Dunkirk. The imports of France, Belgium, and Germany in 1899 were less than those from 1896 to 1898; but it is to be remarked that the downward motion is at an end—the figures for 1900 (eleven months) being 15,041 tons, against 12,136 tons in 1899. In future, however, the unfavourable condition of agriculture in Europe must be feared. Markets should be sought in new places where it is only in its infancy, and also in distant Colonies, where products are worth much more than in countries which grow cereals. The situation, then, is very good, especially as the cost of sulphuric acid has considerably decreased. This favourable condition will last, one may hope, because markets will always be numerous. England is admirably situated to economically ship to all parts of the world. The world's production of sulphate last year is estimated as follows: England, 210,000 tons; France, 37,000 tons; Belgium, Holland, Sweden, Norway, and Denmark, 33,000 tons; Germany, 120,000 tons; Austria, Russia, Spain, and other European countries, 35,000 tons; United States, 58,000 tons—total, 493,000 tons, valued at £5,200,000. The totals for the two preceding years were: 1899, 468,000 tons; 1898, 440,800 tons.

ELECTRIC LIGHTING NOTES.

The Board of Trade have revoked the Electric Lighting Order granted to the Swadlincote District Council in 1897.

On Monday last week, the Gravesend Town Council, after a "record" sitting, passed a resolution adopting a scheme for the electric lighting of the borough at an estimated cost of £30,000.

The Gas and Electricity Committee of the Belfast Corporation have laid before that body a statement showing that during the past year the use of electricity has made substantial progress both for lighting and motor purposes. The number of units sold increased almost one-third over the previous year's figures; but the rental only advanced by 13·6 per cent.

The proposal of the Electric Lighting Committee of the Coventry City Council to apply to the Local Government Board for sanction to the borrowing of £18,000 for electric lighting works was referred back to them when brought before the Council, in order that they might consider the question of carrying out a scheme which would last for some years. During the discussion, remarks were made on the losses already sustained in connection with the undertaking; and memorials were presented from certain ratepayers protesting against additional capital expenditure.

The report of Mr. G. Wilkinson, of Harrogate, who was appointed by the Otley District Council to advise them on the question of the establishment of a public electricity supply for the town, has just been presented to the Council; and it was last Friday under consideration by the Electric Lighting Committee. Mr. Wilkinson's proposals include the establishment of a steam-driven generating plant in a field near the river, capable of providing current for 6750 8-candle lamps. He estimates the capital outlay at £18,000, and the annual expenditure at £1122 15s. The revenue is to be derived from the sale of current to 6750 lamps, at 6d. per unit, averaging 7s. per lamp per annum—a total of £2362 10s. Thus the annual gross profit is £1239 15s., and the net profit is estimated at £231 15s. In comparing this scheme with that for obtaining a supply in bulk from the Yorkshire Electric Supply Syndicate, he estimates the total annual expenditure for the latter at £2110 10s., and the receipts at £2250; thus giving a net annual profit in favour of local works of £92 5s.

At last the Board of Trade are moving in the matter of reducing the authorized maximum price for electric current. It is reported that the Skipton Urban Council (who are seeking a Provisional Order to

supply electricity in their district) have received a letter from their Parliamentary Agents, stating that they had been informed by the Board of Trade that—having regard to the advance made in electrical science, and to the development in methods of distribution since 1899, when the maximum price of 8d. per unit was adopted, and as they understand that the price actually charged is as a rule much less than 8d.—they are of opinion that the time has come when the maximum of 8d. should no longer be allowed. They propose, therefore, in the Provisional Orders now before them, and in all Orders applied for in the future, to fix a maximum of 6d. per unit. The Skipton Council directed the Clerk to appeal to the Board of Trade to allow the price to remain at 8d. in their Order, on the ground that the Council had applied for the Order on the faith of the price inserted in the Board's Model Order.

The question of having electric lighting at Sudbury was once more under discussion at the meeting of the Town Council last Tuesday. It arose on the reading of the minutes of the General Purposes Committee, which showed that the estimates of the cost of electric lighting had risen from £16,000 to £20,000. The additional £4000 elicited an inquiry from Mr. Constable as to whether there was not something wrong. Alderman Mauldon said he had hoped to see the question of what motive power they should use to obtain their electricity discussed, as he found that current could be produced by means of a new gas-engine at 1d. per unit. So far as the refuse destructor was concerned, he was of opinion that the intense heat required would cause excessive wear and tear, and also that the £2000 estimated as the cost would not be a saving, as the Engineer calculated that the same expenditure must be incurred by the Urban Sanitary Authority for the removal of the refuse as was paid now. Mr. Constable said he had been informed that the destructor at Colchester was a failure; and, if it was a failure there, what would it be in a little borough like Sudbury? The Mayor (Mr. F. Wheeler) said the matter of the destructor was before the town twelve months ago, and had been brought forward at the various meetings of the Council and of the General Purposes Committee. Alderman Grimwood said he had no idea the question had been discussed at any meeting of the Council. He certainly could not see, in a small town like theirs, with a population of 7000 and a rateable value of some £19,000 or £20,000, that they required a refuse destructor. Surely they were not going to rush into an expenditure of £20,000 to £30,000 for electric lighting and a destructor without any discussion. This was the first he had heard of any proposition to spend such an enormous sum; and he protested against any attempt to pass it through without voting. The confirmation of the minutes having been moved and seconded, Mr. R. Mattingly urged the Council to pause before embarking on a very large outlay. He suggested that the electric light was a luxury, and a very doubtful one; and he considered that the man in the street, with whom the ultimate liability rested, should be consulted. He criticized the Engineer's report, and said that if all his "ifs" did not come off, and the loss he himself predicted the first year did, it would find its way to every door in Sudbury, and, instead of being associated with progressiveness, the town would be associated with bankruptcy. Mr. Death also opposed the electric lighting scheme, believing that the present was not the time to spend so much money. The Mayor said the replies to the circulars issued by the Corporation showed that the majority of the ratepayers were anxious that the work should be carried out, and by the Council; and he urged them to advance with the times. Alderman Grimwood declared that every practical business man knew the electric light could not possibly pay in any sense or form; and it would make them the laughing-stock of surrounding towns. Mr. P. Constable moved, as an amendment, that the question of applying for a loan for electric lighting and the erection of a refuse destructor be referred back to the General Purposes Committee. Alderman Grimwood seconded the amendment. On being put, the voting was equal; whereupon the Mayor gave his casting vote against it, and the minutes were passed. The town is consequently committed to a scheme which may prove to be a greater burden than is at present contemplated.

Hanover New Water-Works.—Until last year the city of Hanover possessed only very old plant to provide its supply of river water. Extensive works, commenced in 1896, however, were then finished; the object of the reservoir which was constructed being to supply river water to the various public establishments and also water for streets and gardens. The plant includes a set of four centrifugal turbines, each of 43 effective horse power, driven by a head of the River Leine. By aid of gearing, these turbines work two sets of double-action plunger pumps, which can lift about 1½ million gallons per day to an altitude of 105 feet. The water is collected in a reservoir situated in a tower at a corner of the building. The capacity of this reservoir is about 9 million gallons. The works being situated in a part of the town where there are gardens and numerous monumental structures, among others the Royal Palace and the new Town Hall, the architects designed them to accord with the surroundings. The ornaments outside the buildings, which are in the Renaissance style, are very artistic; and the cost of construction amounted to £40,000.

The Parliamentary Estimate of the Derwent Valley Water Board.—The Derwent Valley Water Board have deposited for the information of Parliament, estimates, prepared by their Engineer, showing the gross and net expenditure which will be incurred in the event of sanction being given to the proposals contained in their Bill for this session. The estimated gross expenditure of the proposed new works is put down at £703,000, of which a single line of railway from Hope Woodlands to Derwent will cost £19,315, and the other works, including the proposed new Derwent reservoir, £683,685. It is, however, estimated that the authorized works proposed to be abandoned, which include the already sanctioned Derwent reservoir, would have cost £441,000. The gross estimate is thus reduced to £262,000, which is the amount given by the Engineer as the actual additional expenditure which will have to be met should the Bill receive the sanction of Parliament. To provide for this expenditure, the Board will ask for £300,000 further borrowing powers, and such other sums as may be necessary to pay the cost of passing the Bill through Parliament, and for the payment of interest on this sum until ten years from the passing of the Act.

LONDON WATER COMPANIES' NEW REGULATIONS.

Conference of Borough Councils—Attitude of the London County Council.

A Conference of representatives of the London County Council, the Corporation of London, the City of Westminster, and Metropolitan Borough Councils was held on Monday last week, at the County Hall, Spring Gardens, for the purpose of considering the amended regulations in regard to the supply of water which have been drawn up by the London Water Companies, and submitted to the Local Government Board for approval, in view of the inquiry ordered by the Board to be opened yesterday at the Guildhall, Westminster, under the presidency of Mr. Charles Perrin, M.Inst.C.E., the Official Water Examiner under the Metropolis Water Act, 1871. Mr. W. H. Dickinson, Chairman of the London County Council, presided.

The Chairman, in explaining the objects of the meeting, which had been adjourned from the 25th ult. owing to the death of the Queen, said there could be no matter of more common concern to Londoners than the question they now had before them. In point of finance alone the proposed new regulations, if adopted, would affect almost every individual householder in the Metropolis. The County Council had tried to get roughly some idea of what the cost to the individual householder would be if the new regulations were sanctioned. They had taken a house at a rateable value of £45, and they found that it would cost £53 to carry out the regulations. In another house, with a rateable value of £250, the cost would be £85, and if it had not a proper system there would be £125 of additional expenditure. But perhaps the most striking instance occurred with reference to a block of artisans' dwellings in course of construction. In that case they had estimated the cost of the water-fittings under the old and the proposed new regulations, and they found that, whereas the cost under the former would be £60, under the latter it would be £125, or £65 more. If this kind of thing was to apply to all the houses in London, as it undoubtedly would to a very great extent, the present situation was one of very great seriousness, There could be no doubt that these regulations had evoked the hostility, not only of the County Council, but of the Borough Councils. The Royal Commission last year had brought to their notice the fact, of which everybody who had studied the London water question was aware, that there was an enormous amount of waste of water going on in the Metropolis. This waste was to a large degree to be attributed to the fault of the Companies, in not properly carrying out the powers they possessed. The quantity of water supplied in London in July last was 247 million gallons a day; and if all the Companies carried on their work in the same way as the Kent Company, the amount required would have been only 222 millions, or a saving of 25 million gallons. To his mind, this was the question to which the Companies ought to have applied their minds long before they asked for further powers connected with the construction and management of private houses. The Royal Commission had reported in favour of the purchase of the Companies' undertakings by some public authority; and there could be but little doubt that the Government would very shortly take up the question and deal with it. It, therefore, seemed a very inopportune moment for the Companies to ask for additional powers, when there might be some further change when the undertakings came into the hands of a public authority. The only effect which the passing of these regulations would have would be to place the Companies in a much better position before the arbitrators.

It was decided to deal with the subject on the lines of the elaborate joint report of the Water and Public Health Committees of the Council to which reference was made in the "Journal" a fortnight ago.

Mr. M'Kinnon Wood (Chairman of the Joint Committee) moved the first resolution—"That the Local Government Board be requested to adjourn the inquiry, seeing that the Government have intimated their intention of introducing a Bill in the session of 1902 dealing with the water question." He said the object of the Water Companies in bringing forward these regulations at the present moment must obviously be to increase the amount they would receive in the event of purchase. He thought the conference should begin its proceedings with an emphatic protest against this, in the interests of the consumers.

Mr. Shaw Lefevre seconded the resolution; and it was carried.

It was then decided to oppose the suggested extension of the definition of "communication-pipe" so as to include the pipe up to the ball-valve, on the ground that such an alteration would enable a company to prevent the repair of a defective communication-pipe, and to call for the substitution of a new one. The conference considered that the new regulation requiring that every house, with certain exceptions, should have its own communication-pipe should be struck out, and the old one substituted. The new regulation requiring every house, or, in the case of flats, each suite of rooms, to be provided with a cistern of a size to hold a quantity of water equal to 25 gallons per room, was the subject of much opposition. The conference finally decided unanimously to oppose the regulation, with a view to its being struck out.

The proceedings closed with a vote of thanks to the Chairman.

At the Meeting of the Council next day, the report above alluded to was brought up, and, after a few remarks, adopted. Discussion then took place on its various recommendations to oppose certain of the regulations with a view to their being struck out. The most important was that referring to the proposal that each house, flat, or tenement should have a cistern. The Committee recommended that this regulation should be opposed at the inquiry. Mr. Beachcroft thought the Council might well pause before resisting this regulation tooth and nail. If efforts were to be made to provide sanitary cisterns in houses, the Council should not be the body to offer any resistance. They might represent to the Local Government Board that the regulation should not be retrospective. Mr. Emden pointed out that the system of cisterns, especially in smaller houses, was an absolute death-trap. He said there was no form of cistern which could be invented that could always be kept from getting foul. Mr. M'Kinnon Wood hoped the Council would speak with no uncertain voice in opposition to such a regulation as this, which had been unanimously condemned by the conference of Borough Councils. On a division, the recommendation

was carried by 99 votes to 4. The rest were adopted, with certain additions and omissions; and a resolution was passed in favour of permitting owners and occupiers of property to use three instead of two gallon flushes for sanitary purposes, if they so desired.

PROTECTION OF SOURCES OF WATER SUPPLY.

At the final Meeting of the North Riding County Council, as at present constituted, held at Northallerton on the 30th ult.—Mr. J. Hutton in the chair—the Sanitary Committee reported that they had had before them a letter and report from the County Councils Association on the subject of the law as affecting sources of water supply; and as the question was one which might at some time seriously affect the North Riding, they recommended the Council to pass a resolution approving of the principles of a Bill submitted by the Association, to authorize the constitution of authorities with powers for the protection of the water supplies which are or may be required for local purposes. Dr. Glen, in moving a resolution in accordance with the recommendation of the Committee, said that, as the law at present stood, there was no uniform or regulated authority for dealing with this matter. Corporations outside the North Riding could apply to the owners of land and obtain water from districts within it. There were now deposited notices by the Leeds Corporation, who were seeking power to take water from the North Riding. They would all agree that this was a very important question; and he thought the Council would unanimously come to the conclusion that the Association should be urged to proceed with their Bill as soon as possible. The Hon. G. E. Lascelles agreed that it was a very proper thing that the Council should be able to protect their own area with regard to the taking of water by other authorities. But it struck him that the Association Bill did not sufficiently protect the rights of private owners; and he suggested that before it was introduced this point should be carefully considered. Mr. J. Lowther, M.P., said, so far as he could see, the Association Bill was introducing another authority, of which there were already too many. The proposed measure would, moreover, require considerable watching. The Chairman said the suggested Bill had not been adopted by the Association; it had been drafted by a Special Committee, and would be submitted at an early meeting for the approval of the Executive Committee. All that the Sanitary Committee were now asking for was that the Council should approve of the general principle that County Councils should have *locus standi* in the Committees of the House of Commons to enable them to watch measures that seriously affected them. There was one very large water-works scheme in the northern part of the county, and, as Dr. Glen had told them, another was being promoted by the Leeds Corporation. The water supplies of the North Riding were extremely copious and valuable. Wensleydale, Swaledale, and many of the other dales contained a large supply of water which at any time an outside authority might envy and wish to get possession of; and it was very desirable that the Council should be in a position to watch over the interests of the county. This, he took it, was all that was meant by asking the Council to approve of the general principle. With regard to the details, no doubt the measure required amendment in various directions. The motion was carried.

GAINSBOROUGH WATER SUPPLY.

The Largest Well in England.

In a recent number of "Engineering," an illustrated description appeared of a very remarkable piece of work in well-boring which has been going on at Gainsborough for some considerable time, and has lately been completed. It is specially interesting also as its diameter and depth make it the largest borehole in England. The account forms a record of untiring patience, combined with great engineering skill. The boring was commenced in March, 1895. The upper portion is lined with 36-inch tubes down to a depth of 30 ft. 6 in.; the next section being a 36-inch hole down to 321 feet, and is lined with 30-inch wrought-iron tubes. The whole, when screwed together, is 286 ft. 10½ in. long, and weighs about 28 tons. The annular space at the back of these tubes was afterwards filled with concrete to make them watertight, and to keep out the hard water from the marls. A 24-inch boring was then continued to 724 feet, when, on April 1, 1897, an accident happened, owing to treacherous strata. The heavy pendant boring-tool, weighing 2¾ tons, with cable of 1⅛ tons, stuck fast; and in trying to release it the cable parted, dropping the tool, with 500 feet of rope coiled up on the top of it, and filling the hole up to 300 feet below the surface. The cable was recovered; but long-continued and strenuous efforts to remove the tool by ponderous iron rods were unsuccessful, and only brought down more infall, making the difficulty greater. The contractor therefore decided to enlarge the hole to 29 inches diameter from 321 feet down to the base of the tool; and this was eventually successful. As can be imagined, the greatest difficulty was to bore round the tool, which was about 31 feet long. Very great care had to be taken, and a special tool, some 45 feet long, resembling a gigantic tuning-fork, was used; and eventually, after much work, the old tool was recovered. The boring was continued to a depth of 775 feet, when the next section of 475 feet of 18-inch tubing was lowered. The work was then continued with an 18-inch boring, down to 1076 ft. 6 in., when, in consequence of continued infall, and in order to ensure the permanency of the work, it was decided to further line the bore with tubes. The hole was then reduced to 15¼ inches, at which diameter it was continued to 1515 ft. 1 in., when, owing to the appearance of permian marls in the sandstone, it was decided to stop the work, which has been about 5¾ years in completion, and has cost £6645. The Urban District Council (whose Consulting Engineer is Mr. Percy Griffith, Assoc.M.Inst.C.E.) are now receiving tenders for pumping machinery that will be capable of lifting at least 50,000 gallons of water an hour.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The lecture which was given to-night in Glasgow by Mr. A. Wilson, the Manager of the Dawsholm Gas-Works of that city,* was one of a series which has been organized this winter with a view to the education of the community in the work which is done by the various municipal departments, and getting the people to take a greater interest in public affairs. It was with difficulty Dr. Erskine could obtain the approval of his colleagues in the Town Council to the holding of the lectures; but, once started, they have been admitted to be a great success. It is safe to say that, as Mr. Wilson unfolded his descriptions of the plant and appliances which are employed in gas manufacture, and explained the reasons for their use, his remarks fell upon willing and intelligent listeners, and were a revelation to many. Certain it is that they will go far to remove ignorance, and to dispel misconceptions, even prejudices, in the minds of many gas consumers. The narrative was a clear and lucid one. Mr. Wilson is to be congratulated, not merely upon the matter he laid before his audience, but upon the manner of doing it. That his labours were fully appreciated was testified by the frequent and hearty applause with which his observations were received. Were there more of such gatherings, there would be less discontent among gas consumers; for with them, most assuredly, ignorance is not the mother of anything that is good. It would have been impossible to have covered the whole field of gas making and gas supply in a lecture of an hour-and-a-half, which was the time occupied by Mr. Wilson; but he selected the leading features of the industry, and was particularly happy in his descriptions of the methods adopted for the saving of cost in the varied operations which go on inside the city gas-works.

The Edinburgh and Leith Gas Commissioners have accelerated their pace in the matter of the request of the men in their employment for higher wages, to the extent of the Works Committee having held a meeting to discuss the situation, and of the Commission being convened for Monday to consider the report of the Committee. The principal portions of the report are in the following terms:—

Sunday Labour.—Bailie Waterston moved that the Commissioners should allow double pay for all Sunday labour, and Councillor Mallinson seconded. Councillor Kelly moved that the pay should be for time-and-a-half, and Councillor Maxton seconded. Sir Andrew M'Donald moved that the Commissioners should, in view that it was admitted that Sunday labour was at present unavoidable, delay consideration of this matter till the removal of the gas-works to Granton. A division was taken on the question; and the Committee resolved to recommend delay by 11 votes to 5. They also resolved to recommend the Commissioners to adopt the proposal of the Engineer, that the double shift by the retort-house men should be worked on a week-day, and not on Sundays as at present. The Committee resolved to recommend that Sunday labour by men in the Streets Department should now be counted time-and-a-half.

Overtime.—Councillor Mallinson proposed that the Commissioners should be asked to allow time-and-a-half for overtime to all workmen paid by the hour, and Bailie Waterston seconded. Mr. Fisher proposed, as an amendment, that the wages should be time-and-a-quarter till ten o'clock at night, and time-and-a-half thereafter, and Councillor Menzies seconded. By 13 votes to 4, the Committee resolved to recommend adoption of the amendment.

Extra Labour by Retort-House Hands within Ordinary Eight-Hour Shift. Bailie M'Kelvie moved that the wages for such be one-half more than the extra at present allowed, and Councillor Mallinson seconded. Provost Mackie moved, as an amendment, that no change should be made, and Mr. Robertson seconded. By 8 votes to 6, the Committee resolved to recommend the adoption of the amendment. The Committee instructed the Engineer to discourage, as far as possible, extra labour, and to submit to the Works Committee monthly a return of all the defaulting workmen causing such labour. In regard to the cleaning of regenerators, the cinder men, and the engine driver, the Committee recommend no change.

Purifier Men.—The Committee recommended that the Engineer should take off the extra man at present allowed to each gang of eight for Sunday, and should give an extra ½d. per hour to all the able-bodied men in the Edinburgh, Leith, and Portobello works. As to the other men, they resolved to recommend that the Engineer should treat them as he thought proper.

Holidays, or Wages in Lieu Thereof.—The Committee resolved to recommend the Commissioners to accede to the Union's request to allow holidays *pro rata*, as follows: For two months' work, one day; for four months', two days; for six months', three days; and for eight months', four days.

There was submitted a letter received by the Clerk, addressed by Mr. Blackwood to the Town Clerk of the Edinburgh Town Council, complaining of the delay in disposing of the application, and desiring a reply by the 6th inst. The Clerk was instructed to write that the Committee had resolved on recommendations, which were to be submitted to the Commissioners on Monday for their decision; and he was to promise to send a note of the decision as soon as possible.

Of course, the Commissioners will not admit that they have been at all hurried on by anything the men have done, and I daresay such may be the case; but the men will feel that they have scored in the matter of pressing the Commissioners to come to a decision. I have little doubt but that the finding of the Committee will not be satisfying to the men. We shall thus see soon what the strength of the Union is. Recent indications would seem to point to its possessing great strength in the city; but if this should be the case, it surely must be on the general labourers' and not the gas workers' side that the strength lies. I should think that gas workers are too well off to be, as a body, discontented. The report of the Committee brings out that the men have a strong backing inside the Commission.

The Town Council of Aberdeen, on Monday, considered the report of their Gas Committee, proposing, as stated in my "Notes" last week, to postpone consideration of the request of the men in the gas-works for higher wages till September, when the estimates for the year are being made up. Mr. G. Kemp, the Convener of the Committee, in submitting the report, said that, as a matter of fact, they had not the money at the present time with which to give the advance asked, even if it were conceded as being a reasonable one. Upon this question, the Committee did not express any opinion in the meantime. But it had been pointed out that the tendency in the labour market was downwards rather than upwards. This, coupled with the fact that the first application only came before the Council after the budget for the year

* The lecture will be found on p. 412.

had been fixed, left the Committee without any option but to refuse the advance. He moved the approval of the report. Mr. Gray moved an amendment to the effect that the report of the Committee be not approved of, and that the increase asked for by the gas workers be granted. The Council had the good sense to approve of the recommendation of the Committee by 25 votes to 7. They have thus secured delay, and will get whatever benefit there will be from the coming dulness in trade. To raise wages in a falling market would be folly.

The battle of the sites for the new gas-works for Falkirk was again the leading topic of conversation at the meeting of the Town Council this week. It arose in an objection by the minority who favour the smaller site—that at Parkhouse—to the action of Mr. Russell, the Convener of the Gas Committee, in getting the Town Clerk to write to Mr. A. Gillespie, of Glasgow, whom they had consulted in the matter, for further information. There was difficulty in getting the letters in, not on the part of Mr. Russell, who had no desire to conceal what had taken place, but on the part of those who were opposed to him, and who seemed disposed to make a mountain out of a molehill. When, after the matter had been made as much mystery of as possible, the letters were read, it transpired that Mr. Russell had sent a correction on a matter of fact to Mr. Gillespie; pointing out to him that the gas consumption doubled itself in six, and not in nine, years as Mr. Gillespie had stated, and that he had asked him if the Parkhouse site would be large enough if an adjoining strip of ground were taken in. Mr. Gillespie's reply was to the effect that the Parkhouse site would, on the basis of the gas consumption doubling in six years, be only equal to the output for seven, instead of twenty, years, as he had reported, and that the strip of ground would not make it suitable. An attempt was made to get the Provost to rule that Mr. Russell had acted wrongly, but he would not; and so the incident ended in nothing being done.

On the same occasion, Mr. Russell made a correction of the statement put forward by Bailie Bogle at the last meeting of the Council, to the effect that the leakage of gas was 25 per cent. In the first full year of the undertaking under Corporation management, he said, the leakage was 20 per cent. This was reduced next year to 16 per cent.; and the figure was now 13 per cent. He ridiculed the idea of Larbert hiving off from Falkirk. If they did so, he contended, they would have to pay for all the pipes lying in their district, and their share of the undertaking as a going concern as well. This view makes it almost a certainty that no more will be heard of hiving off.

The Town Council agreed to a recommendation by the Gas Committee, to the effect that, instead of granting their stokers an advance of wages, they should give them a bonus of 2s. per week during the months of November, December, and January. Mr. Russell said that inquiries had been made in ten or twelve towns, two of which seemed to pay wages rather higher than Falkirk, a number of them paid less, while four or five were about the same. The Committee thought, in these circumstances, there was no reason why they should advance, seeing their rate was higher than the majority of other towns like Falkirk. At the same time, however, owing to the fact that, with the somewhat congested state of the retort-house in the winter months, the men wrought under oppressive circumstances, they thought it would only be fair to allow them a bonus equal to 2s. per week, to be paid to the men who remained regularly at work during November, December, and January—the bonus to start from the time the application was made. This is certainly a very ingenious method of overcoming labour troubles. On account of its very ingenuity, it deserves success.

An inquiry was held before Sheriff-Substitute Campbell Smith, in Dundee, on Thursday, into the circumstances attending the explosion of gas in the workshop of a firm of clothiers in Murraygate, Dundee, on Dec. 20 last, by which a man and lad were killed. The evidence of one of the partners of the firm was to the effect that they had been trying, since the occurrence, to find out how the explosion took place; but they had failed to discover any signs of an escape. Several gentlemen who had examined the premises were of opinion that most of the gas had been coming in from some of the street-pipes. Only a day ago, they discovered that a piece of the asphalte on the floor had been broken above one of the manholes of the drain, as if the escape had come from underneath. An employee told how the explosion happened. The man who was killed, he said, removed a gas-standard and placed a lighted candle between the flooring and the ceiling of the apartment below. This differs from what was previously stated, and is no doubt correct. It brings out clearly that the action of the man was a reckless one. It transpired also that a smell of gas was noticed in the place for about a week, and had been reported to the firm on the morning of the day; that the firm procured a plumber to look after it; that the plumber returned to his place of business for something; and that the explosion occurred in his absence. It also appeared that there were usually about twenty workpeople in the place; but that at the hour of the afternoon at which the accident happened, there were only five or six persons present, all of whom were injured. The Sheriff said it was a mystery to him how the gas came to be there. There must have been a considerable quantity of it; and the witnesses seemed to have noticed the smell of it for some time past. The explosion might have been caused by coal gas, but there were other explosives besides coal gas. There was marsh gas. It was marvellous that, after all the knowledge there was about the danger of going near an escape of gas with a light, this should have taken place in an establishment where there were so many onlookers. He hoped the memory of the occurrence would not be lost upon Dundee; and perhaps other destruction more deadly than this would be avoided. A verdict of "Death by accident" was returned.

The proposed transfer of the undertaking of the Carnoustie Gas Company to the Corporation is beginning to take shape. It will be remembered that the Directors mentioned a sum of £12,000 as the price at which they would be willing to sell. Thereafter the Town Council consulted Mr. J. M'Gilchrist, of Dumbarton, upon the value of the undertaking; and he gave them the figure of £10,919. This was communicated to the Company; and on Wednesday the Directors met to consider the matter. It was suggested that the shareholders should be called together; but this was objected to on the ground that the Corporation have not yet adopted the Gas Acts. It was pointed out that there was practically no difference between the sum asked and that offered, because, by the time that coal, consumers' accounts, and the like, had been squared up, the Corporation would have to pay fully £12,000. The Directors, after a long discussion, resolved to call in the services of a consulting engineer for themselves, before arriving at a decision upon the subject. They have appointed Mr. A. Yuill, of Alloa. The capital of the Company is £6000; and a dividend of 7½ per cent. has been paid for years. The consumption is rising rapidly; and under the new Manager (Mr. J. W. Napier), the affairs of the Company are flourishing. The price asked, therefore, is not out of the way.

At a meeting of the Edinburgh Town Council on Tuesday, notice of motion was given to the effect that a report be procured from the Town Clerk, the City Chamberlain, and the Accountant Auditor of the city, backed up, if so advised, by the opinion of counsel, on the questions: (1) Whether the provision made, and being made, for the maintenance and renewal of the more perishable portions of the electric lighting undertaking is sufficient; (2) whether the present method of dealing with this matter is the best and most efficient available under the statute; and (3) if not, what alternative would they suggest. This will again raise a question which has been much discussed in the Town Council, and upon which, it would appear, no satisfactory arrangement has yet been made.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 9.

Sulphate of Ammonia.—There is some recovery from the dulness which has pervaded the market during the past weeks, and prices have been fairly well maintained; the closing quotations being £10 15s. to £10 18s. 9d. per ton f.o.b. at the ports. In Scotland, makers, who have hitherto been very firm, accepted £10 17s. 6d. per ton f.o.b. Leith; but they now decline to repeat this. Elsewhere, there has not been much change. Direct business is still a limited quantity; buyers persisting in holding the view that the lowest point has not been touched. But deliveries on contracts continue on a large scale; and there is nowhere any considerable stock in makers' hands. The interest of buyers is mainly in the forward position, but their ideas are very little above spot prices, while makers are holding for £11 5s., ordinary terms, f.o.b. Leith, and £11 5s. London, Beckton terms. There has been, however, speculative offering abroad at below makers' prices; and this has rather encouraged buyers in holding aloof.

Nitrate of Soda is quiet at 8s. 4½d. to 8s. 7½d. per cwt., according to quality, on spot. Cargoes to arrive are, however, firmly held at about 8s. 9d. per cwt.

LONDON, *Feb.* 9.

Tar Products.—The only change worth noting is an unaccountable weakness in benzol, which is very remarkable having regard to the fact that producers have no stocks, and that the consumption in every direction is an enlarging one. The enormous quantity of aniline now going into black dyeing should influence the position of 90's benzol more than it has. A change may come very shortly. Aniline is quoted dearer; and the improved value is bound to reflect itself on benzols. Fifties are neglected, and quoted much lower For solvent there is a slightly better inquiry; but there is very little offering. Carbolic acid is steady. Creosote salts are weak and unsaleable. There is nothing new to report in respect to anthracene, which remains in the old rut of neglect.

Prices are as follows: Tar, 13s. 6d. to 17s. Pitch, east coast, 32s.; west coast, 29s. Benzol, 90's, 1s.; 50's, 10d. Toluol, 1s. Crude naphtha, 4d. Solvent naphtha, 1s. 1d. Heavy naphtha, 11d. Creosote, 1d. Heavy oils, 2d. Carbolic acid, 60's, 2s. 6d. Naphthalene, 90s. to 95s. Salts, 65s. Anthracene, nominal, "A," 3d.; "B," 2d.

Sulphate of Ammonia, after some fluctuation in prices, is to-day a little firmer. There are substantial inquiries for important quantities for spring delivery. Makers hold no stocks worth speaking of; and there is no reason why sulphate should be sold at a lower price. Business has been done at prices ranging between £10 17s. 6d. to £11, less 3½ per cent.; but few makers would sell forward at this price.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—The break-up in prices, to which reference has previously been made in these reports, has now commenced. With the winter season still on, the better qualities of round coal suitable for house-fire purposes are not, of course, affected to any appreciable extent; but even here the position is weakening, and coal from other districts is being sent into local markets at considerably under Lancashire prices, which are still quoted about 16s. to 17s. per ton at the pit for best Wigan Arley, 14s. 6d. to 15s. for Pemberton four-feet and seconds Arley, and 13s. 6d. to 14s. for common house coal. The downward move in other descriptions of fuel is, however, unmistakable, and in some instances considerable. The statement made at the half-yearly meeting of the Lancashire and Yorkshire Railway Company, that coal is now being bought at 2s. to 2s. 6d. per ton under last year's prices, may be regarded as some forecast of what is likely to take place when the large contracts for locomotive fuel and gas coal come upon the market, about a couple of months hence. In common round coal for steam and forge purposes, prices during the past week or so have been easing down materially, and representatives of collieries are showing more eagerness to quote for supplies; while the competition from other districts is increasing in keenness. For ordinary steam coals, about 11s. 9d. to 12s. per ton would now represent the full average prices at the pit. The engine fuel trade continues to be cut up by competition from Derbyshire, Staffordshire, and Yorkshire; and this is restricting buying to practically hand-to-mouth requirements, not more than month-to-month bargains being the general rule. Pit-prices in the Lancashire district average about 10s. 6d. to 11s. per ton for burgy, 10s. for best slack, and 9s. for the medium sorts. Staffordshire and Derbyshire slack is, however, to be bought at 5s. 6d. to 6s. per ton at the pit; and Yorkshire slack, according to quality, at from 6s. to 8s. For forward engine-fuel contracts, if large consumers were prepared to settle, it is difficult to say what prices Lancashire collieries might be prepared to accept; but

7s. 6d. per ton for ordinary descriptions of slack, delivered over the ensuing twelve months, would no doubt represent a figure at which it would not be at all difficult to buy. In the shipping trade there is a continued quietening down in the demand, with lower prices quoted; 13s. 6d. to 14s. per ton being about the average rates for steam coal, delivered at the ports on the Mersey. For coke prices are weak; unwashed Yorkshire furnace cokes being offered freely at about 11s. to 11s. 6d. per ton at the ovens, with washed Lancashire cokes quoted about 10s., and best foundry cokes 26s. to 27s. at the ovens.

Northern Coal Trade.—The colder weather of the last few days has decidedly improved the demand for coal; and in some directions it seems to have checked the fall in prices which has been continued so long. In the steam coal trade, there is still dulness, because that trade depends largely upon markets which are now closed by winter. Best Northumbrian steam coals are quoted from 11s. 3d. to 11s. 6d. per ton f.o.b., and steam smalls are 5s. 6d. Some of the steam coal collieries are working short time; but on the whole the pits are kept going well for this season. In the gas coal trade, the tendency is towards steadiness. The demand is heavy, though it is known that some of the great gas coal consuming companies had relatively heavy stocks at the end of the half year. For occasional cargoes of best Durham gas coals the price is from 10s. to 10s. 9d. per ton f.o.b.; but some contracts are still running at much higher rates. Coke is weaker. For export coke, about 19s. per ton f.o.b. is quoted; while the price of blast furnace coke is 15s. at the Teesside furnaces. Gas coke is weaker; and for household supplies the price is now about 18s. per ton, delivered in Newcastle.

Scotch Coal Trade.—Trade is not brightening, but is, in fact, declining. The miners have almost unanimously given their vote against the proposed reduction of a shilling per day. Last Friday, the Conciliation Board met in Glasgow to consider the action to be taken. After four-and-a-half hours' discussion, the Board were unable to arrive at any decision in the matter; and the meeting was adjourned to admit of arrangements being made, if possible, for the calling in of a neutral chairman. Quotations are down about 5s. per ton; to household consumers the reduction is 1d. per cwt. The prices quoted are: Main 10s. 3d. to 10s. 6d. per ton f.o.b. Glasgow, ell 11s. to 12s., and splint 11s. 9d. to 12s. The shipments for the week amounted to 111,533 tons—a decrease upon the previous week of 54,618 tons, and upon the corresponding week of last year of 97,889 tons. For the year to date, the total shipments have been 689,503 tons—a decrease of 39,415 tons on the same period of last year.

A Birmingham correspondent sent the following telegram to the "Financial News" last Thursday: "The slump in pig iron was intensified to-day; quotations showing a further fall of 2s. 6d. to 5s. per ton. Northampton forge was offered at the lowest price recorded for nearly three years. Smelters are scrambling for orders to keep their furnaces alight, and they are accepting contracts for a single hundredweight. Unless business improves, additional furnaces in Staffordshire, Derbyshire, and Northamptonshire will be blown out."

Plumbers' Strike at Sheffield.—Up till the end of last week, a strike of plumbers had been in progress at Sheffield since the 31st of December. The dispute had its origin in a demand made by the men some months ago for an advance in the rate of their wages from 9d. to 9½d. per hour. To this the master plumbers replied with counter-demands for a reduction of ½d. per hour in the rate of pay, and also for the acceptance of a new set of working rules and conditions, completely changing the customs of the trade. The masters proposed to abolish payment for what is known as "walking time"—*i.e.*, the time occupied by a workman in walking between his employer's workshop and the place where his work was to be done—and also to reduce the working week in the four winter months from 49½ to 47 hours. These conditions the men could not see their way to accept. The strikers included the men employed in the Water Department of the Corporation; but the General Manager (Mr. W. Terry) has been able to make an arrangement under which they will all resume work. The Corporation are willing to give the 9½d. per hour in consideration of the men working under the new conditions, which place them in precisely the same position as operative plumbers in other large towns. The employers are greatly dissatisfied at the action of the Corporation; and they maintain that, in the present state of trade and declining prices, when other large towns are considering reductions in wages, for the Sheffield employers to give an advance would be regarded as being decidedly unfair to the public.

Water Supply of Surrey Parishes.—Last Wednesday, Mr. F. H. Tulloch, M.Inst.C.E., held an inquiry, on behalf of the Local Government Board, at the offices of the Guildford Rural District Council, into an application made by that Authority for sanction to a proposal to give to the Woking Water and Gas Company a guarantee securing the payment to them by the Council of the sum of £110 per annum for five years; being 5 cent. per annum upon the cost of providing and laying water-mains for the parish of Ockham. The application was made under section 39 of the Woking Water and Gas Act, 1899; and it was opposed on behalf of the Ockham Parish Council and the Earl of Lovelace, on the broad ground that the general health of the district had not suffered from the existing supply, which is drawn from wells. Several witnesses were called. The Chairman of the District Council (Mr. H. M. Weston, J.P.) said they did not feel safe with the present service, and they had made the application solely in the interests of the parishioners. The Clerk (Mr. W. S. V. Cullerne) pointed out that the charge would be for five years only, and said there might not be any burden whatever upon the parish, as the more the water was taken the less would be the amount to be paid out of the rates. The proceedings, which occupied about four hours, then closed. An inquiry was held on the same day by Mr. Tulloch in regard to a similar application with respect to the water supply of Worplesdon; but it only lasted a few minutes. In this case the proposal was to give the Woking Company a guarantee of £40 per annum for five years; and there was no opposition—the parishioners, in fact, pressing the matter forward. The Company have been supplying another part of the parish for several years.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 389.

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 12	10½	Alliance & Dublin 10 p.c.	19—20	..	5 5 0
100,000	10	,,	7½	Do. 7 p.c.	13½—14½	..	5 3 5
300,000	100	Jan. 2	5	Australian 5 p.c. Deb.	99—101	..	4 19 0
200,000	5	Nov. 14	6	Bombay, Ltd.	6—6½	..	4 12 4
40,000	5	,,	6	Do. New, £4 paid	4—4½	..	5 6 8
380,000	Stk.	Aug. 15	12	Brentford Consolidated	257—262	..	4 11 7
270,000	,,	,,	9	Do. New	183—188	..	4 15 9
50,000	,,	,,	5	Do. 5 p.c. Pref.	130—135	..	3 14 1
159,375	,,	Dec. 13	4	Do. 4 p.c. Deb.	112—115	..	3 9 7
220,000	Stk.	Sept. 14	10	Brighton & Hove Orig.	220—230	..	4 6 11
226,320	,,	,,	7	Do. A. Ord. Stk.	150—160	..	4 7 6
1,033,500	Stk.	Aug. 29	5	Bristol, 5 p.c. max.	121—123	..	4 1 4
420,000	20	Sept. 28	10	British	39—41	..	4 17 7
50,000	10	Aug. 15	12	Bromley, Ord. 10 p.c.	24—26	..	4 12 4
79,000	10	,,	9	Do. 7 p.c.	19—21	..	4 5 8
500,000	10	Oct. 12	6	Buenos Ayres (New) Ltd.	8¼—8⅝	..	6 17 2
220,000	Stk.	Dec. 28	4	Do. 4 p.c. Deb.	95—98	..	4 1 8
150,000	20	July 12	8½	Cagliari, Ltd.	23—25	..	6 12 0
100,000	10	Sept. 28	8	Cape Town & Dis., Ltd.	14—15	+½	5 6 8
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	53—55	..	5 9 1
550,000	Stk.	Oct. 12	12½	Commercial Old Stock	275—280	..	4 11 1
236,425	,,	,,	9½	Do. New do.	207—212	..	4 12 0
238,237	,,	Dec. 13	4½	Do. 4½ p.c. Deb.	132—137	..	3 5 8
800,000	Stk.	Dec. 13	9	Continental Union, Ltd.	160—165	..	5 9 1
200,000	,,	,,	7	Do. 7 p.c. Pref.	160—165	..	4 4 10
575,000	Stk.	Aug. 15	5†	Crystal Palace Ord. 5 p.c.	117—122	..	4 2 0
60,000	,,	,,	5	Do. 5 p.c. Pref.	130—135	..	3 14 1
486,030	10	Jan. 31	11	European, Ltd.	18½—19½*	+½	5 12 10
354,060	10	,,	11	Do. £7 10s. paid	13½—14½*	..	5 13 9
15,079,885	Stk.	Aug. 15	4 4/6	Gas-light and Coke	4 p.c. Ord.	..	4 8 0
2,600,000	,,	,,	3½		3½ p.c. max.	..	3 15 3
3,799,735	,,	,,	4		4 p.c. Con. Pref.	..	3 7 10
4,053,423	,,	Dec. 13	3		3 p.c. Con. Deb.	+1	3 3 10
70,000	10	Oct. 26	8	Hongkong & China, Ltd.	13—14	..	5 14 4
3,800,000	Stk.	Nov. 14	10	Imperial Continental	203—208	..	4 16 2
473,600	Stk.	Aug. 15	3½	Do. 3½ p.c. Deb. Red.	100—102	..	3 8 8
561,000	Stk.	Aug. 30	10	Liverpool United A	232—234	..	4 5 6
678,100	,,	,,	7	Do. do. B	173—175	..	4 0 0
306,083	,,	Dec. 28	4	Do. do. Deb. Stk.	120—122	..	3 5 7
75,000	5	Dec. 13	6	Malta & Medn., Ltd.	4⅜—5¼	..	5 14 3
560,000	100	Oct. 1	5	Met. of	5 p.c. Deb.	106—109	+1	4 11 9
250,000	100	,,	4½	Melbourne	4½ p.c. Deb.	104—106	..	4 4 11
541,920	20	Nov. 14	3½	Monte Video, Ltd.		9⅝—10⅜	..	6 13 4
667,946	Stk.	Aug. 30	9½	Newc'tle & G'tesh'd Con.		224—226	..	4 1 10
299,855	Stk.	Dec. 28	3½	Do. 3½ p.c. Deb.		101—102	..	3 8 8
						*Ex. div.		

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment
£			p.c.	GAS COMPANIES.			£ s. d.
150,000	5	Nov. 29	8	Oriental, Ltd.	7—7½	..	5 6 8
135,000	5	,,	8	Do. New, £4 10s. pd.	5¾—6¼	+¼	5 15 3
15,000	5	,,	8	Do. do. 1879, £1 pd.	1¼—1½	..	4 11 5
60,000	5	Sept. 28	7	Ottoman, Ltd.	5—5½	..	6 7 3
851,070	10	Oct. 12	7	River Plate Ord.	10—10½	..	6 13 4
250,000	Stk.	Dec. 28	4	Do. 4 p.c. Deb.	97—99	−1	4 0 10
250,000	10	Sept. 28	8	San Paulo, Ltd.	11—12	..	6 13 4
135,000	Stk.	Sept. 14	10	Sheffield A	232—236	..	4 4 9
203,700	,,	,,	10	Do. B	232—236	..	4 4 9
447,427	,,	,,	10	Do. C	232—234	..	4 5 6
5,761,885	Stk.	Aug. 15	5†	South Met., 4 p.c. Ord.	134—137	..	3 13 0
1,547,965	,,	Jan. 16	3	Do. 3 p.c. Deb.	93—96	..	3 2 6
380,940	Stk.	Nov. 14	5	Southampton Ord.	103—110	..	4 10 11
70,825	,,	Jan. 16	4	Do. 4 p.c. Deb.	103—110	..	3 12 9
120,000	Stk.	Aug. 30	6	Tottenham and Edmonton	A. 5 p.c.	113—118	..	5 1 8
250,520	,,	,,	4½		B. 3½ p.c.	85—90	..	5 0 0
61,550	,,	Dec. 13	4		4 p.c. Deb.	107—112	..	3 11 5
182,380	10	Jan. 16	5	Tuscan, Ltd.		8—9	+½	5 11 1
149,500	10	Jan. 2	5	Do. 5 p.c. Deb. Red.		97—102	..	4 18 0
				WATER COMPANIES.			
780,499	Stk.	Dec. 28	11	Chelsea, Ord.		297—302	−6	3 12 10
150,000	,,	,,	5	Do. 5 p.c. Pref.		155—160	..	3 2 6
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75		142—145	..	3 2 1
175,785	,,	Sept. 28	4½	Do. 4½ p.c. Deb.		143—148	..	3 0 10
1,720,560	Stk.	Oct. 12	7	East London, Ord.		190—195	−3	3 11 10
654,740	,,	Dec. 13	4½	Do. 4½ p.c. Deb.		147—152	..	2 19 3
797,687	,,	,,	3	Do. 3 p.c. Deb.		94—96	..	3 2 6
700,000	50	Dec. 13	8	Grand Junction	10 p.c. max.	103—112	..	3 11 5
310,000	Stk.	Sept. 28	4		4 p.c. Deb.	125—130	−5	3 1 7
708,000	Stk.	Aug. 30	14	Kent		303—308	..	4 10 11
160,000	,,	,,	7	Do. New, 7 p.c. max.		200—210	..	3 6 8
1,043,800	100	Dec. 28	10½	Lambeth, 10 p.c. max.		288—293	−2	3 11 8
466,200	100	,,	8	Do. 7½ p.c. max.		208—213	..	3 15 1
350,000	Stk.	Sept. 28	4	Do. 4 p.c. Deb.		125—130	−1	3 1 7
500,000	100	Aug. 15	14	New River, New Shares		417—422	+2	3 6 4
1,000,000	Stk.	Jan. 31	4	Do. 4 p.c. Deb.		127—130*	..	3 1 7
502,300	Stk.	Dec. 13	7	South-wark and	Ord.	193—198	..	3 10 8
126,500	100	,,	7		7½ p.c. max.	175—180	..	3 17 9
489,200	Stk.	,,	5		5 p.c. Pref.	155—160	..	3 2 6
1,019,585	,,	Oct. 12	4	Vauxhall	4 p.c. A Deb.	125—130	..	3 1 7
1,155,065	Stk.	Dec. 13	10	West Middlesex		280—290	..	3 9 0
200,000	,,	,,	4½	Do. 4½ p.c. Deb.		140—145	..	3 2 1
200,000	,,	Sept. 14	3	Do. 3 p.c. Deb.		97—99	−1	3 0 7
						*Ex. div.		

† Next dividend will be at this rate.

Reduction of Price at Newcastle.—The Directors of the Newcastle Gas Company have resolved to reduce the price of gas by 1d. per 1000 cubic feet from the commencement of the current quarter—making the charge 2s. 2d. per 1000 cubic feet.

Dorchester Gas-Fittings Company, Limited.—The profits realized by this Company last year amounted to £81 12s. 11d.; and the net sum available for distribution at the annual general meeting to-day is £186 8s. 7d. A dividend of 6d. per share (equal to about 7 per cent.) will be declared, and £148 18s. 7d. carried forward.

Sale of the Shipley Gas-Works.—A formal meeting of shareholders in the Shipley Gas Company, Limited, was held last Wednesday, for the purpose of considering the decision of the Directors to sell the undertaking to the District Council. Mr. Joseph Hill presided. The meeting was private; but it is understood the sale was sanctioned.

Hull Corporation and the Gas Supply.—At the monthly meeting of the Hull City Council last Thursday, on the minutes of the Water and Gas Committee being up for confirmation, Alderman Massey, the late Chairman of the Committee, congratulated the Council and the city on the fulfilment of the pledges he gave two-and-a-half years ago, when he succeeded in inducing the Council to assent to the purchase of the Kingston-on-Hull Gas-Works at a cost of £92,500. The Council had not only reduced the price of gas to consumers in the old town from 3s. to 2s. 8d. per 1000 cubic feet, but they had paid off the cost of the works and secured an acre of land in a most important position of the city, without its costing the ratepayers one penny.

The Water-Gas Plant at Lincoln.—Last Tuesday, at the meeting of the Lincoln City Council, Alderman Wallis (when moving the adoption of the minutes of the Gas Committee) said the new water-gas plant had been at work since Dec. 17, and had realized to the fullest extent all the anticipations of the Committee. It was constructed to produce 500,000 cubic feet of purified gas per day of 24 hours. They had been working one shift of eight hours daily, and had made as much as 197,500 cubic feet of gas, which far exceeded the guaranteed producing power of the plant. The expenditure of coke as fuel for the generator had been as low as 28½ lbs. per 1000 cubic feet of gas. The most important factor in the cost of carburetted water gas was the oil, which represented 75 per cent. of the total manufacturing cost. The previous Friday they made 197,527 cubic feet of purified gas of an illuminating power of 19·72 candles; and the oil used was 2·6 gallons per 1000 cubic feet—working out at 7·58 candles per gallon. These results spoke for themselves, and would bear favourable comparison with the reports from other towns. The following figures would show how necessary this additional plant had proved, even during the very mild winter. In previous years all the coal-gas retorts had been fully employed; but during the ten months ended the 31st ult., the total make of coal gas was 250,345,000 cubic feet. The total make for the same time last year was 245,930,000 cubic feet. Up to Jan. 31 the production of carburetted water gas had reached 5,504,000 cubic feet; so that the total increase for the ten months of the current year was 9,910,000 cubic feet. The money spent on the new plant was well spent.

Incandescent Gas Lighting at Dublin.—The Dublin Corporation on Monday last week voted £800 for incandescent gas lighting. They have spent £500 in previous years; and it is now intended to put up incandescent gas-lights where the electric light will not be installed.

Mond Gas Scheme.—The Wednesbury Town Council have decided to oppose the Mond Gas Bill; but before a public meeting is called in connection with the matter, the Town Clerk is to furnish the Council with further particulars. It appears that all it is desired to secure is the protection of the rights and interests of the inhabitants. The Brierley Hill District Council have also put themselves in a position to oppose the Bill, in order to protect the interests of the ratepayers. The Halesowen District Council have referred the question of opposition to a Committee for consideration.

Gas and Electric Lighting in Bucharest.—The Gas Company of Bucharest, whose chief office is in Paris, are negotiating with the Communal Administration for a forty years' concession for the lighting of the city. The Municipal Council propose to replace the gas-lamps in the centre of the town by electric lights and the oil-lamps in the suburbs by gas. The concessionaires would be granted an exclusive right to lay electric cables in the town for lighting and motive power. Exception is made, however, in the case of conduits for electric traction. The offer of the Company has received favourable consideration. In event of its acceptance, the construction of an important electric power station would, it is understood, be immediately commenced.

New Joint-Stock Companies.—The Incandescent Gas-Mantle Protector Company, Limited, has been registered with a capital of £5000, in £1 shares, to manufacture and deal in all kinds of gas-fittings and accessories, and particularly in "Fitz-Rho" mantle protectors. The Primitiva Gas and Electric Lighting Company of Buenos Ayres, Limited, has been registered with a capital of £1,200,000 in £5 shares (160,000 preference), to adopt an agreement between La Companhia Primitiva de Gas de Buenos Ayres and H. Ward to acquire gas or electric light works in the River Plate and other countries in South America, or elsewhere, and to carry on the business of manufacturers, generators, and suppliers of gas, electricity, and other illuminants and force, as engineers, engine and machinery builders, gas and electric stove makers, wharfingers, contractors, &c. The Northern Counties Electricity Supply Company, Limited, has been formed with a capital of £200,000 in £1 shares, for the purpose of establishing works to supply electricity for lighting, motive power, traction, and any other public or private purpose. The Directors have secured Provisional Orders for South Blyth, Cowpen, Spennymoor, Barnard Castle, Malton, and Thirsk; and they have obtained consents from the Local Authorities of Alnwick, Annfield Plain, Consett, Benfieldside, Shildon, Handsworth, Norton, and Pickering. The Hydroleum Company, Limited, has been registered with a capital of £2000, in £1 shares, to carry on the business of machinists, engineers, boilermakers, steam, gas, and oil engine-makers, &c. The Webb Lamp Company, Limited, with a capital of £2000, in £1 shares, will carry on the business of lamp manufacturers, gas and electrical engineers, &c.

SUTHERLAND'S
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ESSEX WORKS, BIRMINGHAM.

Tenby Water-Works.—The Tenby Water Committee have decided to apply for permission to borrow £16,000 to carry out new works in connection with their water-supply system.

New Issue of Brentford Gas Stock.—It may be remembered that attention was called in the "JOURNAL" a few weeks ago to the fact that the Brentford Gas Company were inviting tenders for £46,875 of 4 per cent. perpetual debenture stock, to be issued under the provisions of their Order of 1881. We learn that the whole of the stock was allotted, at prices ranging from £111 10s. down to £106 5s., or an average of £106 18s. 10d., per cent.

Stockton's Progress.—Alderman Rudd, in moving the adoption of the Finance Committee's minutes at the meeting of the Stockton Corporation last Tuesday, quoted some figures, which speak "more than words," for the progress of Stockton since 1887 to date. Among his statistics the following are found: In 1887, 198 million cubic feet of gas were sold; now the consumption amounts to 366 millions. The gas consumers have increased from 5050 to 8500; and the receipts of the department have risen from £29,284 to £56,000.

Bewdley Water Supply.—At the quarterly meeting of the Bewdley Town Council last Tuesday, a communication was read from the Local Government Board sanctioning the raising of £12,000 for carrying out the Blackstone Well water scheme for the borough. The money is to be repaid in equal instalments in 30 years, except £900 for the land, the repayment of which was spread over 50 years, and £1600 for machinery, which must be paid back in 15 years. The Council decided to at once obtain tenders for carrying out the work.

Otley Gas Bill.—At the last meeting of the Otley District Council, the Solicitor was instructed to write to the Gas Company to the effect that there are certain matters in the Parliamentary Bill for the increase of the Company's capital which the Council thought should form the subject of inquiry before they decided whether to oppose the Bill or not. The Company are to be asked to allow an expert to examine the works and accounts, with a view of coming to a satisfactory agreement. Mr. Barker, who moved the resolution, said he did so because the clause stipulating that the Company should supply the town at a less rate than ordinary consumers was struck out, and the maximum price of the gas was too high.

Incandescent Gas v. Electric Lighting at Newport (Mon.).—Towards the close of the proceedings at the recent half-yearly meeting of the Newport (Mon.) Gas Company, referred to elsewhere, Mr. S. Batchelor, one of the proprietors, asked the Chairman (Mr. R. Laybourne) if there had been any diminution in the revenue from public lighting. The Chairman replied that there had not, but that, on the contrary, there had been an increase of £28 12s., owing to the extension of the borough and new streets being lighted. Mr. Batchelor: Then the electric lighting has not really injured our position? The Chairman: No. We are lighting a large portion of the town with the incandescent light; and though the Newport Corporation are proprietors of the electric installation, the gas-lights are giving such satisfaction that they are adopting them for street-lamps.

Paris Gas Company's Revenue Last Year.—During the past year, the Paris Gas Company obtained from the sale of gas a revenue of 89,242,447 frs., against 82,630,736 frs. in 1899; being an increase of 6,611,711 frs., or at the rate of 8 per cent.

Wages of Foremen Gas Stokers Advanced at Leeds.—The Leeds Corporation have increased the wages of the foremen stokers at the Meadow Lane and New Wortley works from 44s. to 48s. per week, and at the York Street works from 43s. to 47s. per week.

Failure of the Teignmouth Gas Supply.—Some inconvenience was caused at Teignmouth early on Wednesday morning by the gas supply failing for a short time. A deputation from the Town Improvement Association waited on the District Council on Thursday and complained of the gas supply generally and of this incident in particular. The Gas Manager (Mr. T. Stormonth) explained that the temporary cessation of the supply was due to the new governor at the works failing to act, and he could not help it.

Incandescent Gas Lighting in Leeds.—The incandescent gas system continues to make headway in Yorkshire's commercial capital; and last Wednesday the Corporation confirmed several resolutions relating to the subject. One of these was that this lighting be substituted for ordinary gas in a number of streets, constituting a very considerable extension. The Lighting Committee also reported the receipt of a letter from Messrs. North and Sons, Solicitors, on behalf of the Leeds Estates Company, Limited, calling the attention of the Committee to the desirability of lighting New Bond Street and Cheapside by electricity. The Committee said they had resolved that these important central thoroughfares should be lighted for the present by the incandescent system. This was confirmed by the Council.

Over-Production of Carbide on the Continent.—We learn from a correspondent that the unsatisfactory condition of the calcium carbide industry and acetylene gas lighting on the Continent recently led to the formation of a Syndicate of owners of German, Swiss, Austrian, Swedish, and Norwegian carbide works, which resolved to establish a single sales bureau through the intermediary of the Gold and Silver Scheide Anstalt of Frankfort-on-the-Main. With a few exceptions, the members of the Syndicate have since then been compelled to shut down their works in order to reduce the excessive stocks of carbide which have accumulated; and it is not known how long the cessation of manufacturing operations is likely to continue. One of the exceptions is the well-known Aluminium Company of Neuhausen, which has on hand old orders from the Prussian State Railway authorities, which will occupy them for a further period of two years. The total annual production of the syndicated works amounts to 50,000 tons, whereas the consumption is only about 12,500 tons yearly in those five countries. It will thus be some time before the accumulated stocks will be reduced, and any advance take place in the unremunerative prices which have prevailed for so many months. The Continental situation of the industry is rendered all the more critical by reason of the fact that considerable over-production exists also in France and Italy, where the output is likewise four times in excess of the consumption.

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Devonport Gas Company's Bill.—A meeting of the Devonport Gas Company was held on Thursday, for the purpose of confirming the resolution authorizing the Directors to promote the Bill which is now before Parliament for the extension of the capital and powers of the Company. Mr. A. Bennee (the Chairman) presided. The meeting was private, but it was stated at the close of the proceedings that the resolution approving of the Bill was carried with only three dissentients.

Suffocation by Gas.—A sad case of suffocation by gas occurred at Bath late last Wednesday night or early on Thursday morning. It appeared that a kitchenmaid named Rachel Allan, aged about 20, in the employ of the Rev. Edward Handley, did not appear as usual in the morning. Attempts to call the girl were fruitless, and the door of her bedroom was locked. The butler obtained a step-ladder, and on opening the window was almost overcome by a rush of gas. The girl was found dead, half in and half out of bed, as though she had attempted to get up. The gas-stove in the room was not alight, but the gas was turned on fully. At the inquest on Friday, Mr. W. G. Quicke, Assistant-Engineer to the Bath Gas Company, expressed the opinion that the stove had been left alight by the deceased, and that this had exhausted the oxygen in the room, with the result that the gas-flames were extinguished. The Jury found that death was accidentally caused by gas poisoning, and said they were of opinion that a great deal more ventilation was needed in the room. At the Coroner's request, they also stated that they accepted Mr. Quicke's suggestion that the exhaustion of the oxygen put out the flame in the stove, and left the gas escaping.

Opposition to the Aldershot Gas and Water Bill.—At an adjourned meeting of the Aldershot District Council last Thursday, a Sub-Committee reported the result of an interview they had had with the Aldershot Gas Company, and recommended that steps should be taken to oppose the Company's Bill, and that the necessary advertisements should be issued of a special meeting of the Council to pass the requisite resolution. Mr. Brown proposed the adoption of the recommendations. He stated that the chief grounds of the opposition were: (1) That the Bill vested the power of purchase, extending over the district of Frimley, in the Aldershot Council; and (2) that the Frimley district was to be charged 1s. per 1000 cubic feet more than Aldershot. In answer to the Chairman (Mr. Pain), Mr. Brown said at present the charge of the York Town Gas Company was 4s., and that of the Aldershot Company 2s. 9d. The latter Company proposed to abolish the York Town works, but he thought if these were utilized there was no reason why a lower price should not be charged to Frimley. The Company argued that they did not see why outsiders should reap the benefits of profits from water as well as gas. Mr. Hollings thought that if the Council threatened they might get what they wanted without going further. The Chairman suggested that an interview with the Parliamentary Agent (Mr. Hooker) might produce some good result; and it was resolved that the Chairman and the Clerk should see him before the petition was lodged.

Newton Water-Works Loan.—The Newton District Council have resolved to apply for a Provisional Order to borrow £31,000 for water-works purposes, in lieu of the £6000 already authorized by the Local Improvement Act.

Fire at a Chemical Works.—A fire broke out between six and seven o'clock last Sunday morning, at the chemical works of Messrs. Forbes, Abbott, and Lennard, manufacturing chemists, Ordnance Wharf, Blackwall. On the wharf were six storage tanks, each containing about 60,000 gallons of tar. Three had caught fire, and threatened the surrounding buildings. The fire was a difficult one to deal with; but the great quantity of water which was thrown upon the flames extinguished them. The outbreak had been preceded by a violent explosion, which had caused a general wreckage of the corrugated iron building used as a boiler-house, &c. There was considerable damage to property.

Colne Valley Water Company.—At the half-yearly meeting of this Company to-day (Tuesday), the Directors will report that the capital expenditure in the six months ending Dec. 31 amounted to £12,795, the greater part of which was incurred in the further extension of the 24-inch pumping main, and the laying of a length of 14-inch main for improving the supply in the Harrow district. Other extensions are being carried out to meet the rapidly increasing demand for water in the Company's area of supply. The total revenue amounted to £12,780; the expenditure to £5303—leaving £7477 to be carried to the dividend and interest account. The balance of this account, after the payment of the usual interest on the debenture stock and preference shares, and transferring £250 to the reserve, is £6919, out of which it is proposed to pay a dividend for the half year at the rate of 6½ per cent. per annum; leaving £1088 to be carried forward.

Colwyn Bay Gas-Works Purchase Scheme.—The question of the advisability of the Colwyn Bay Urban District Council purchasing the local gas undertaking gave rise to a heated discussion at a public meeting held at Old Colwyn last Friday. Mr. G. Bevan, Chairman of the Council, pointed out the great advantages to be derived from having the gas under public control, and denied that the existing electric lighting plant would depreciate the value of the gas-works. He pointed out that at Llandudno and Rhyl the profits of the gas undertakings had been devoted to reducing the rates, and said that, unless some similar assistance was soon obtained, it would be impossible for the Council to carry out much-needed improvements, such as the proposed water reservoir and sewerage scheme, without raising the rates to an unbearable degree. By a clause in the Company's Act, the Council could now purchase by arbitration, but in June next the clause would be inoperative, and the ratepayers' chance of acquiring the works at a reasonable price would be lost for ever. Mr. Burroughs criticized the Council's action; and Mr. Owen, speaking amid uproar, declared that the whole meeting had been "cooked." Mr. T. Parry, the Chairman of the Electric Lighting Committee, urged the ratepayers to purchase, and held up the example of Leamington as a warning. Several other speakers followed; the proceedings becoming more and more heated. Finally the meeting, by a large majority, rejected the purchase proposal.

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SWINDON (New Swindon Gas Co.)	120,000	CRYSTAL PALACE DISTRICT	2,000,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	DULUTH, MINN.	300,000
WINDSOR ST., BIRMINGHAM (Second Cont.)	2,000 000	CATERHAM	150,000
HALIFAX	1,000,000	LEICESTER	2,000,000
TORONTO	250,000	ENSCHEDE (HOLLAND)	150,000
OTTAWA	250,000	BUENOS AYRES (RIVER PLATE CO.)	700,000
LINDSAY (Remodelled)	125,000	BURNLEY	1,500,000
MONTREAL	500.000	KINGSTON-ON-THAMES	1,750,000
TORONTO (Second Contract; Remodelled)	2,000,000	ACCRINGTON	500,000
BELLEVILLE	250,000	TONBRIDGE	300,000
OTTAWA (Second Contract)	250,000	STRETFORD	500,000
BRANTFORD (Remodelled)	200,000	OLDBURY	300,000
ST. CATHERINES (Remodelled)	250,000	TODMORDEN	500,000
KINGSTON, PA.	125,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
PETERBOROUGH, ONT.	250,000	YORK (Second Contract)	750,000
WILKESBARRE, PA.	750,000	ROCHESTER (Second Contract)	500,000
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BUFFALO, N.Y.	2,000,000	TOKIO, JAPAN	1,000,000

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Narrow Escape from Suffocation.—The Chairman of the Hull Corporation Water and Gas Committee (Mr. W. G. Wharram) had an exceedingly narrow escape from suffocation by gas in his bedroom last Thursday night. He had retired to rest, and during the night his son heard him making a peculiar noise. Becoming alarmed, he entered his father's room, and found the apartment full of gas, and his father in an unconscious state. He took prompt steps to restore respiration; but it was two hours before Mr. Wharram was brought round. The latter attended several Committee meetings at the Town Hall the next day, and was heartily congratulated by his colleagues on his narrow escape. At the meeting of the Works Committee, Mr. Richardson remarked that it was rather unique that the Chairman of the Corporation Gas Committee should be almost suffocated by his own gas.

Sales of Stocks and Shares.—At the Mart, Tokenhouse Yard, on Monday last week, Mr. Alfred Richards sold, under instructions from Directors and owners, several parcels of gas and water stocks. The first lots offered were new ordinary £10 shares in the Southend Water Company, entitled to a dividend of 5 per cent. per annum; and they realized prices ranging from £11 7s. 6d. to £12 5s. per share. A small parcel of "B" consolidated stock of the Wandsworth and Putney Gas Company was sold at the rate of £121 per cent.; and some 3 per cent. consolidated debenture stock at £73 per cent. A few new ordinary £10 shares in the Great Yarmouth Water Company, carrying 4 per cent. dividend, fetched £10 5s. each; and some similar shares in the South-West Suburban Water Company, carrying 5 per cent., fetched £14 10s. apiece. At recent sales, some £25 shares in the Gosport Gas Company were disposed of at £35 10s. each; and four shares of similar nominal value in the Boston Water Company, at £54 15s. apiece. A few £25 shares in the Lymington Gas Company have been disposed of at from £34 to £35 10s. each. Mr. H. E. Porter offered for sale by auction at Gravesend, last Tuesday, 60 shares of £20 each in the Gravesend and Milton Gas Company, at prices ranging from £33 5s. to £34 10s. per share.

Messrs. R. Dempster and Sons have been successful with their tender for extensions at the Conway Gas-Works—their price being £5130.

The Norden District Council have determined to oppose the Heywood Water Bill; and their action has been endorsed by the ratepayers.

Application is to be made by the Warrington Town Council to the Public Works Loan Commissioners for a loan of £60,000 for water-works purposes.

The Gateshead Town Council have instructed the Town Clerk to write to the Newcastle and Gateshead Gas Company that they consider the Company should grant an advance of 1s. a week in the wages of each lamplighter in all grades.

Frederick John Derrett, aged 27, a shunter, employed at the Stapleton Road Gas-Works, Bristol, met with his death through injuries received while pursuing his duties last Friday week. A verdict of "Accidental Death" was returned at the inquest on Monday last week.

The Badische Anilin und Soda-Fabrik, of Ludwigshafen-on-the-Rhine, have given up their agencies in Great Britain, and transferred the whole of their business to the Badische Company, Limited, who will buy from them, and be the sole importers of their products into this country. The Company will be represented in Manchester and the other districts hitherto supplied by them by Mr. Max Bock and Mr. J. Robertson, as hitherto.

Mr. Charles Churchill, President of the Armstrong-Whitworth Company, of Newcastle-on-Tyne, who is regarded as the pioneer importer of American labour-saving devices in Great Britain, has lately returned from the States, where he placed an order for 50 gas-furnaces, for annealing, hardening, and tempering projectiles, with the American Gas-Furnace Company, of New York, and the Cleveland Machine Screw Company. They are for Woolwich Arsenal.

Early last Tuesday morning the water-main which conveys the Cardiff water supply from the Taff Vawr and Cantref reservoirs to the storage reservoirs at Rhubina and Llanishen burst at a point in the Taff Valley opposite Nantgarw, which is about eight miles up the valley from Cardiff. Shortly afterwards another burst occurred in the main close to the Rhubina reservoir. Through the prompt measures taken by the Engineer (Mr. C. H. Priestley), the town suffered no inconvenience; and before the end of the week, the pipe was repaired.

The Torquay Town Council on Tuesday last approved of a series of payments by way of compensation to the officers of the St. Mary Church and Cockington District Councils, whose districts are now added to the borough. The question as to compensation to Mr. T. Evans, Manager of the St. Mary Church Gas-Works, and as to whether any portion of the compensation to the other officers of the St. Mary Church District Council can be taken from the revenue of the works, was postponed, with a view to its consideration by the Solicitors of the Municipal Corporations Association.

A terrible disaster occurred at Baku last Tuesday. A fire broke out in the magazine of the Caspian and Black Sea Company, containing an immense quantity of petroleum, amounting to 6,000,000 poods. The flames spread to three other depôts with a storage capacity of 12,000,000 poods. While every effort was being made to control the fire, the naphtha poured out like a stream of lava, and inundated the dwellings of the working people. The houses fired and were utterly destroyed. Many persons perished. Four naphtha springs of the Melikoff, two of the Caspian and Black Sea Company, and two of the firm of Rilski, caught fire last Sunday week.

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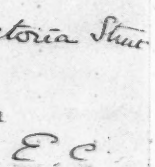

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GAS-METERS for Sale:—
Three 3-light METERS.
Two 10-light "
Two 30-light "
Three 5-light "
Three 20-light "
One 50-light "
Also the following SECOND-HAND METERS:
One 300-light METER.
One 10-light "
Two 5-light "
T. M. DAFFERN, 20, High Street, COVENTRY.

THE Corporation of Liverpool have for DISPOSAL a large number of modern 14-inch square Lamps, Copper built throughout, with plain Glass sides, and Opal Glass top, for use in Cradles or on Legs. They are in good repair; a large number of them being practically equal to new.
A sample will be sent on application. Price 7s. 6d. each at the Stores, Hood Street.
C. R. BELLAMY,
City Lighting Engineer.
Hood Street, Liverpool.

TO BE LET on Hire—
PULSOMETER, Size No. 5, with 4-in. suction and 3-in. delivery. Steam-Pipe 2 in. diameter. Discharge 10,000 Gallons per hour.

TO BE SOLD—
EXHAUSTER for 63,000 feet per hour, with Steam-Engine, by Gwynne. In excellent condition. Replaced by 200,000 feet.
Write J. WRIGHT, Bridge House, BLACKFRIARS BRIDGE, E.C.

TO GAS ENGINEERS AND OTHERS.

THE Corporation of Halifax are replacing the Horizontal Retorts at No. 1 Section of their Gas-Works by Inclines, and have FOR DISPOSAL the following FITTINGS, &c.

RETORT MOUTHPIECES, 20 in. by 13½ in.
Do. do. 18 in. by 13½ in.
5-inch BRIDGE-PIPES, HYDRAULIC MAIN, FURNACE FRAMES and DOORS.
Two PURIFIERS, 18 ft. by 18 ft. by 6 ft. deep.
Four PURIFIERS, 21 ft. by 28 ft. by 6 ft. deep.

Applications to view and offers for same may be arranged by applying to the undersigned.

THOS. HOLGATE, M.Inst.C.E.,
Gas Engineer.

Gas-Works, Halifax.

COUNTY BOROUGH OF HALIFAX.

THE Gas Works Committee of the Halifax Corporation are prepared to receive TENDERS for the supply and erection of a CAST-IRON AMMONIACAL LIQUOR CISTERN and GIRDERS supporting same, at the Gas-Works, Bank Bottom, Halifax.

Full Particulars, Form of Tender, and Print may be obtained from Mr. Thos. Holgate, M.Inst.C.E., Gas Engineer, Halifax.

A deposit of One Guinea is required, which will be refunded on receipt of a *bonâ-fide* Tender.

Tenders, endorsed "Overhead Liquor Cistern," must be sent to the undersigned not later than Ten a.m., on Wednesday, the 20th of February, 1901.

The person whose Tender is accepted will be required to observe the Fair Contracts Clauses adopted by the Corporation.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
KEIGHLEY WALTON,
Town Clerk.

BOROUGH OF BARROW-IN-FURNESS.

THE Corporation are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Gas-Works from the 1st day of April next to the 31st day of March, 1902, delivered into the Purchaser's Tank-Waggons at the Gas-Works Siding.

Any further Information may be had on application to the Manager of the Gas-Works.

Sealed Tenders, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Tar," to be delivered at the Town Clerk's Office on or before Tuesday, the 26th inst.

The highest or any Tender not necessarily accepted.

By order,
C. F. PRESTON,
Town Clerk.

Town Hall, Barrow-in-Furness,
Feb. 7, 1901.

BOROUGH OF BARROW-IN-FURNESS.

THE Corporation are prepared to receive TENDERS for the supply of machine-moulded FIRE-CLAY RETORTS, FIRE-BRICKS, CAST-IRON PIPES, WROUGHT-IRON TUBES and FITTINGS, BRASS COCKS, GAS-METERS, and SULPHURIC ACID as may be required from the 1st day of April next to the 31st day of March, 1902.

Sealed Tenders, on Forms to be obtained at the Office of the Manager of the Gas and Water Works, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Stores," to be delivered at the Town Clerk's Office on or before Tuesday, the 26th inst.

The lowest or any Tender not necessarily accepted.

By order,
C. F. PRESTON,
Town Clerk.

Town Hall, Barrow-in-Furness,
Feb. 7, 1901.

PORT ERIN AND PORT ST. MARY GAS COMPANY.

THE Directors of the above Company are prepared to receive TENDERS for the CAST-IRON and STEEL WORK required in the construction and erection of a GASHOLDER TANK, 62 feet in diameter and 18 ft. 9 in. deep, a SINGLE-LIFT GASHOLDER, with Guide-Framing, Inlet and Outlet Pipes, and the necessary Foundations.

Further Particulars and a copy of the Bill of Quantities may be obtained from Messrs. Thomas Newbigging and Son, Engineers, 5, Norfolk Street, Manchester, on deposit of Two Guineas, which will be returned on receipt of a *bonâ-fide* Tender.

Tenders to be sent so as to reach me not later than noon on the 16th day of February, 1901.

The lowest or any Tender not necessarily accepted.

JOHN MOORE, jun.,
Secretary.

Port St. Mary, Isle of Man,
Jan. 26, 1901.

GLASGOW CORPORATION.
(GAS DEPARTMENT.)

NEW PROVAN GAS-WORKS.
(CONTRACT NO. 4.)

THE Corporation invite Tenders for the IRON and STEEL WORK of ROOFS, GIRDERS, &c., required in the construction of the Retort-House and Coal-Store at their new Provan Gas-Works.

The Plans and Drawings may be seen, and Copies of the Specification, Table of Quantities, and Form of Tender obtained, upon application to Mr. W. Foulis, the Engineer, at his Office, 45, John Street, Glasgow, upon payment of Two Guineas, which will be returned on receipt of a *bonâ-fide* Tender.

Sealed Offers, endorsed "Gas Department, New Provan Gas-Works," must be lodged with the Subscriber on or before Monday, the 25th of February next.

All Offers must remain open for a period of Thirty Days from the date thereof; and the Corporation do not bind themselves to accept the lowest or any Offer.

J. D. MARWICK,
Town Clerk.

City Chambers, Glasgow,
Jan. 29, 1901.

TIPTON URBAN DISTRICT COUNCIL.

THE Gas Committee of the above Council invite SCHEMES and TENDERS for a COKE CONVEYING PLANT, to be erected at their Gas-Works.

Particulars may be obtained from the Engineer, Mr. H. O. Timmins, Gas-Works, Tipton, Staffs.

Tenders will be received not later than Thursday, the 28th. inst., by

JNO. W. WARING,
Secretary.

Gas Offices, Tipton,
Feb. 4, 1901.

COUNTY BOROUGH OF WIGAN.
(GAS DEPARTMENT.)

THE Committee are desirous of obtaining TENDERS for a new DRUM for One of the Station Meters. Capacity 60,000 cubic feet per hour.

Particulars may be obtained from the undersigned, to whom Tenders must be delivered on or before the 18th current, sealed and endorsed "Meter Drum."

The Committee do not bind themselves to accept the lowest or any Tender.

J. TIMMINS,
Engineer, &c.

Wigan, Feb. 8, 1901.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of about 244 yards of 36-inch CAST-IRON PIPES and SPECIALS and 800 yards of 30-inch CAST-IRON PIPES and SPECIALS.

Full Particulars may be obtained from the Gas Engineer, Gas Offices, Bloom Street, Salford.

Sealed Tenders, endorsed "Tender for Pipes," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to me not later than Three p.m. on Thursday, the 21st of February, 1901.

The lowest or any Tender will not necessarily be accepted.

L. C. EVANS,
Town Clerk.

Town Hall, Salford.

NELSON CORPORATION.

THE Gas Committee are prepared to receive TENDERS for the supply of a STATION METER, with Hydraulic Valves and Connections to same, delivered and erected at their Brierfield Works.

Specification and Form of Tender, and all Particulars, may be obtained on application to Mr. A. Allan, Engineer and Manager, Gas-Works, Nelson.

Tenders, endorsed "Station Meter," and addressed to the undersigned, must be received not later than Feb. 21, 1901.

The Committee do not bind themselves to accept the lowest or any Tender.

R. M. PRESCOTT,
Town Clerk.

Town Hall, Nelson,
Feb. 6, 1901.

COUNTY BOROUGH OF BLACKBURN.

TO RETORT AND FIRE-BRICK MANUFACTURERS.

THE Gas Committee are prepared to receive TENDERS for RETORTS, FIRE-BRICKS, and FIRE-CLAY.

Particulars may be obtained on application to Mr. S. R. Ogden, Engineer and Manager.

Tenders, sealed and endorsed "Tender for Retorts, &c.," to be sent in to me not later than noon Thursday, the 21st of February, 1901.

The Corporation do not bind themselves to accept the lowest or any Tender.

By order,
S. R. OGDEN,
Engineer, &c.

Municipal Offices, Blackburn,
Feb. 9, 1901.

DARWEN CORPORATION.
(GAS DEPARTMENT.)

TENDERS FOR FIRE-CLAY, RETORTS, BRICKS, &c.

THE above Corporation are prepared to receive TENDERS for the supply for One Year of FIRE-CLAY, RETORTS, BRICKS, &c.

Forms of Tender and all Information as to Quantities may be obtained on application to Mr. A. H. Smith, Gas Engineer, Darwen.

Sealed Tenders, endorsed "Fire-Clay Goods," must be delivered to the undersigned at or before noon, Saturday, the 23rd day of February, 1901.

By order,
WILLIAM P. HALLIWELL,
Town Clerk.

Town Clerk's Office,
Darwen, Feb. 5, 1901.

MITCHAM AND WIMBLEDON DISTRICT GASLIGHT COMPANY.
(INCORPORATED BY ACT OF PARLIAMENT, 1867.)

NOTICE is Hereby Given, that the SIXTY-EIGHTH ORDINARY HALF-YEARLY GENERAL MEETING of the Shareholders of this Company will be held in the Board-Room, at the Works, Mitcham, in the County of Surrey, on Tuesday, the 26th day of February, 1901, at Three o'clock in the Afternoon precisely, to receive the Report of the Directors and a Statement of the Accounts for the Half Year ended the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in place of those retiring by rotation, and for General Business.

The TRANSFER BOOKS WILL BE CLOSED from the 11th inst. until after the Meeting.

By order,
BENJAMIN GREEN,
Secretary and Manager.

Offices and Works: Western Road,
Mitcham, February, 1901.

TO GASHOLDER MAKERS.

THE Corporation of Haverfordwest in- vite TENDERS for the construction and erection of a new GASHOLDER of Steel, 52 feet diameter by 20 feet deep.

The Material in the Framework and Lattice Girders of existing Holder to be allowed for.

Tenders, accompanied by complete Specifications and Drawings, by Feb. 21, to the undersigned.

The lowest or any Tender not necessarily accepted.

R. T. P. WILLIAMS,
Town Clerk.

Council Chamber, Haverfordwest,
Feb. 4, 1901.

FIRE-CLAY GOODS AND RETORTS.

THE Urban District Council of Buxton invite TENDERS for the supply of RETORTS, FIRE-CLAY GOODS, &c., for a period of Twelve Months.

Forms of Tender and further Particulars may be obtained from Mr. H. Barker, Gas Engineer, Town Hall, Buxton.

Tenders, sealed and endorsed "Retorts," to be addressed to the Chairman of the Gas Committee, and sent so as to reach him not later than the 23rd inst.

By order,
JOSIAH TAYLOR,
Clerk.

Town Hall, Buxton,
Feb. 6, 1901.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the Bell Hotel, Bromley, Kent, on Thursday, the 14th day of February, at Six o'clock p.m. precisely, to receive the Report of the Directors, the Balance-Sheet certified by the Auditors, to declare a Dividend, and for General Purposes.

The TRANSFER BOOKS WILL BE CLOSED from the 1st to the 14th of February, both days inclusive.

By order of the Board,
HENRY W. AMOS,
Secretary.

Offices: At the Works,
Bromley, Kent, Jan. 30, 1901.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at the Company's Offices, Willoughby Lane, Tottenham, on Saturday, the 23rd day of February inst., at Half-past Three o'clock in the Afternoon precisely, to receive the Report of the Directors and Statement of Accounts for the Half Year ended the 31st day of December, 1900, to declare Dividends, and transact such other Business as the Act of Parliament directs.

The TRANSFER BOOKS for the CONSOLIDATED "A" and "B" Stocks WILL BE CLOSED from Friday, the 8th inst., to Monday, the 25th inst., both days inclusive.

By order of the Board of Directors,
JAMES RANDALL,
Secretary.

Offices of the Company:
Willoughby Lane, Tottenham,
Feb. 1, 1901.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held PERIODICALLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by AUCTION of GAS and WATER STOCKS and SHARES under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

SUNDERLAND AND SOUTH SHIELDS WATER COMPANY.

IMPORTANT SALE
OF
WATER STOCK.

TO BE SOLD by Auction in the Long Room of the Queen's Hotel, Fawcett Street, Sunderland, on Thursday, the 21st of February, 1901, at Two o'clock in the Afternoon prompt,

MR. ATKINSON GIBSON, AUCTIONEER,

£15,000

(Nominal) of the NEW STOCK (Maximum Dividend 5 per cent.) authorized to be created and issued under the powers contained in the Sunderland and South Shields Water Act, 1891.

The above Stock will be entitled to Dividend from the 1st day of January, 1901, and be registered in the name of the Purchaser free of charge.

A Deposit of 10 per cent. will be required at the time of Sale; the remainder to be paid on or before the 1st day of March, 1901.

COUNTY BOROUGH OF BOLTON.
(GAS DEPARTMENT.)

THE Gas and Lighting Committee in- vite TENDERS for the purchase of the TAR to be produced at their Gas-Works, during the Thirteen Months from the 1st of March, 1901, to the 31st of March, 1902.

Further Particulars and Form of Tender may be obtained on application to Mr. William Walch, Office Superintendent, Gas Offices, Bolton.

Sealed Tenders, endorsed "Tender for Tar," and addressed to the Chairman of the Gas and Lighting Committee, to be delivered at the Gas Offices, Bolton, not later than Thursday, Feb. 21.

R. G. HINNELL,
Town Clerk.

Town Hall, Bolton,
Feb. 8, 1901.

BOURNEMOUTH GAS AND WATER COMPANY.

ISSUE OF SIX PER CENT. PREFERENCE SHARES.

Sale by Tender of 1000 SIX PER CENT. PREFERENCE SHARES, in pursuance of the Provisions of the Bournemouth Gas and Water Act, 1896.

NOTICE is Hereby Given, that it is the intention of the Directors of this Company to SELL BY TENDER 1000 PREFERENCE SHARES of £10 each (the Dividend on which is limited to £6 per cent), to be paid up in full on or before the 28th of February, 1901.

Particulars and Conditions of Tender may be obtained at the Company's Offices, Bournemouth, or of the Secretary, as under.

Sealed Tenders must be sent to the Secretary not later than Eleven o'clock on Friday morning, the 15th of February, 1901.

By order,
WILLIAM CASH,
Secretary.

London: 90, Cannon Street, E.C.,
January, 1901.

Just Published, with nearly 300 Illustrations, Royal 8vo, 18s.

Edited by C. E. GROVES, F.R.S., and WM. THORP, B.Sc.

GAS LIGHTING,

Describing the Manufacture of Gas and its Application to the purposes of Illumination.

By CHARLES HUNT,
Manager of the Birmingham Corporation Gas-Works.

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J. & A. CHURCHILL, 7, GREAT MARLBOROUGH STREET.

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16, DEANSGATE, MANCHESTER.
GAS ENGINEERS' AGENTS AND CONTRACTORS FOR
Meters, Fire-Clay Goods, Oxide of Iron, and all other Gas Apparatus. Retort Carbon purchased.
Inquiries Solicited.
Telegrams: "DARWINIAN, MANCHESTER."
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HYDRAULIC BLOWER

For blowing Air into Gas Purifiers for the purpose of

REVIVIFYING THE FOULED OXIDE.

Full Particulars on application.

LUXWERKE LUDWIGSHAFEN AM RHEIN.

HOLMSIDE
GAS COALS.

Present Daily Produce over 5000 Tons.

Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation

Yield of Gas per Ton . . . 11,205 Cubic Feet.
Illuminating Power 16$\frac{7}{10}$ Stand. Sperm Candl.
Coke (of good & pure quality) 18$\frac{3}{4}$ Cwt. per Ton.
Sulphur . . . . . A little over 1 per Cent.
Ash . . . . . Under 1 per Cent.
Tar . . . . . 163 lbs. (Avoir.) per Ton.
Ammoniacal Liquor 103 lbs. (Avoir.) per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR
PELTON GAS COALS.

Present Daily Produce available 3000 Tons.

Of equal quality to the "Holmside" Coal, and also very largely used by many Gas Companies at Home and Abroad.

Both descriptions are shipped at Tyne Docks, and Dunston Staiths, River Tyne, also at North and South Docks, Sunderland.

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,
HOLMSIDE & SOUTH MOOR OFFICES,
NEWCASTLE-UPON-TYNE.

BOLDON GAS COALS.

Yield of Gas per Ton. .	10,500	Cubic Feet.
Illuminating Power . .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

As per Analysis by
Mr. JOHN PATTINSON, F.I.C., F.C.S.

For Prices, &c., apply to
W. H. PARKINSON,
THE HARTON COAL CO., LTD.,
NEWCASTLE-ON-TYNE.

Telegraphic Address: "PARKINSON, NEWCASTLE."

GAS-FITTINGS.

BURNERS
Welsbach Pattern
per 7/6 Doz.

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INCANDESCENT

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

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GUARANTEED absolutely free from Arsenic and of excellent Purity. Specially prepared for Sulphate of Ammonia Manufacturers.

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Head Office: Miles Platting, MANCHESTER.
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effects a great saving of time, labour, and expense.

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Rich in Illuminating Power and Yield of Gas.
Above the Average in Weight and Quality of Coke.
Maintains a High Standard in Residuals.

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TYNE
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Yield of Gas per ton . . . . 13,155 cub. ft.
Illuminating Power . . . . 38·22 candles.
Coke per ton . . . . . 1,301·83 lbs.

EAST PONTOP
GAS COAL.

Yield of Gas per ton . . . . 10,500 cub. ft.
Illuminating Power . . . . 17·8 candles.
Coke. . . . . 70 per cent.

SOUTH PELAW MAIN
GAS COAL.

Yield of Gas per ton . . . . 10,500 cub. ft.
Illuminating Power . . . . 16·3 candles.
Coke. . . . . 73·1 per cent.

For Prices and complete Analysis, apply to

THOS. W. DANCE, SON, & HUNTER
COAL OWNERS, NEWCASTLE-ON-TYNE;
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For use in the
RECOVERY OF SULPHUR,
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Removal of last Traces of SULPHURETTED HYDROGEN in catch position.

Full Particulars on application to the Patentees:
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NITRATE of Thorium and Cerium.
FABRIK CHEMISCHER PRAEPARATE VON STHAMER, NOACK, AND CO., HAMBURG.

JAMES OAKES & CO.
ALFRETON IRON-WORKS, DERBYSHIRE,
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Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.,
Manufacture and keep in Stock at their Works (also large stock in London)
PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts and Covers, and rendering Leakage impossible.

THORNLEY GAS COALS
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WEARDALE IRON & COAL Co., Ld.
OUT OF THEIR
THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by
Messrs. J. & H. S. PATTINSON.

Yield of Gas per Ton . .	10,500 Cub. Ft.
Illuminating Power . . .	16·9 Candles.
Coke (of good quality) . .	67·5 per Cent.
Sulphur	0·58 „
Ash	2·73 „

For Price, &c., apply to the
WEARDALE IRON & COAL Co., Ld.
QUAYSIDE, NEWCASTLE-ON-TYNE.

JOHN BROWN & CO., LTD., SHEFFIELD,
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ALDWARKE MAIN, CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.
ALDWARKE MAIN GAS COAL
Analysis: 12,600 Feet of 19-Candle Gas per Ton.
Value in Pounds of Sperm, 820·80.
VERY FREE FROM IMPURITIES.
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A GOOD STOVE AT A LOW PRICE.
"LA BELLE" GAS-STOVES
Are MORE ECONOMICAL and CHEAPER than any OTHER STOVES of an EQUAL CAPACITY.
The Burner is made in two pieces, and can be taken apart and Cleaned in a Moment.
MAXIMUM HEAT with a
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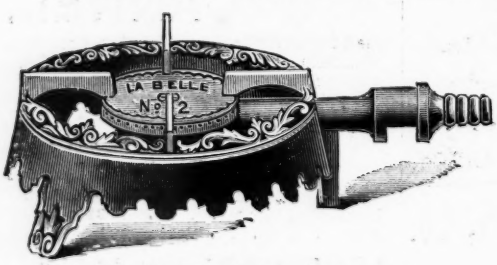

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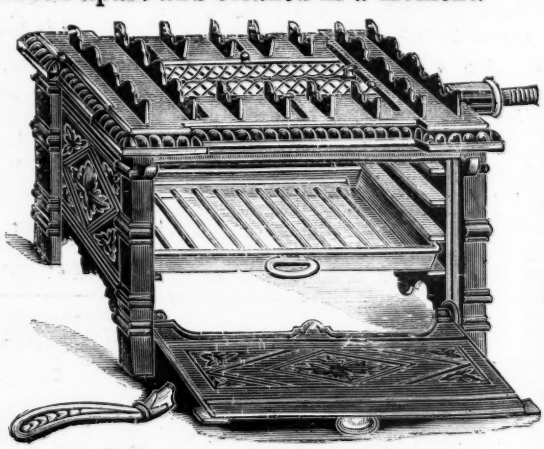
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Contractors to H.M. Government.

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INCLINED, REGENERATIVE, GENERATIVE, AND FLOOR LINE.

SEVERAL THOUSANDS OF OUR SETTINGS IN SUCCESSFUL WORK.

Plans, Estimates, and full Particulars for Complete or Partial Erection and Renewals.

J. & H. ROBUS,

Engineering Contractors for Gas and Water Works,

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And GORING, OXFORDSHIRE.

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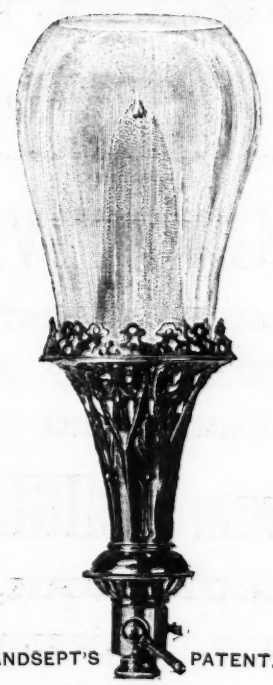
SMALL TORCH BURNER.

Consuming 3½ Cubic Feet of Gas per Hour.

The highest efficiency of any Burner now on the Market.



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Burner with Mantle, **4s.**

With Ornamental Husk, **5s.**

With Ornamental Husk and Bye-Pass, **6s.**

Extra Mantles **4s. 6d.** per dozen.

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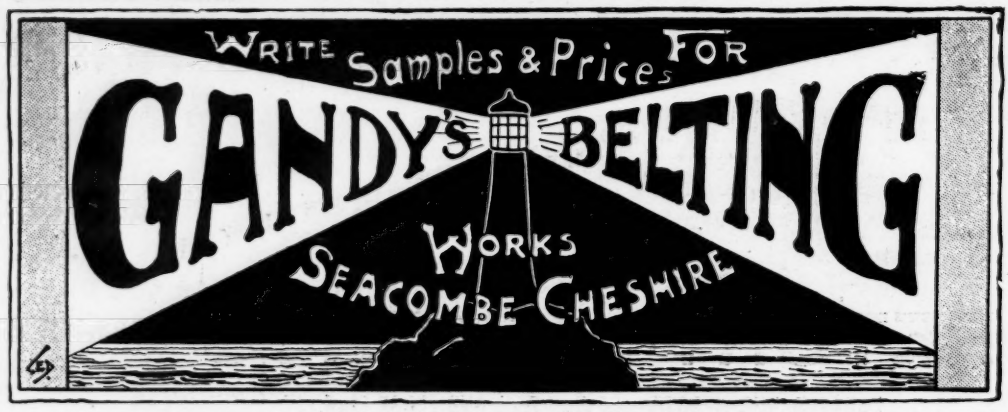

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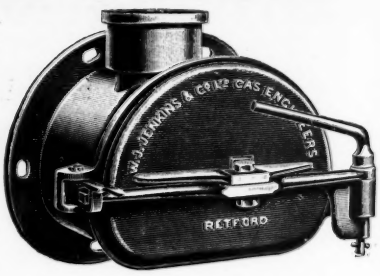
AS USED BY THE LEADING GAS AND WATER COMPANIES.

MOUTHPIECES

WITH SELF-SEALING LIDS FOR HORIZONTAL AND INCLINED RETORTS.

SOLE MAKERS OF

THE "DE BROUWER" PATENT COKE-CONVEYOR.



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Telephone: No. 8013.

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AND A SPECIAL FORM OF WHICH IS APPLICABLE TO

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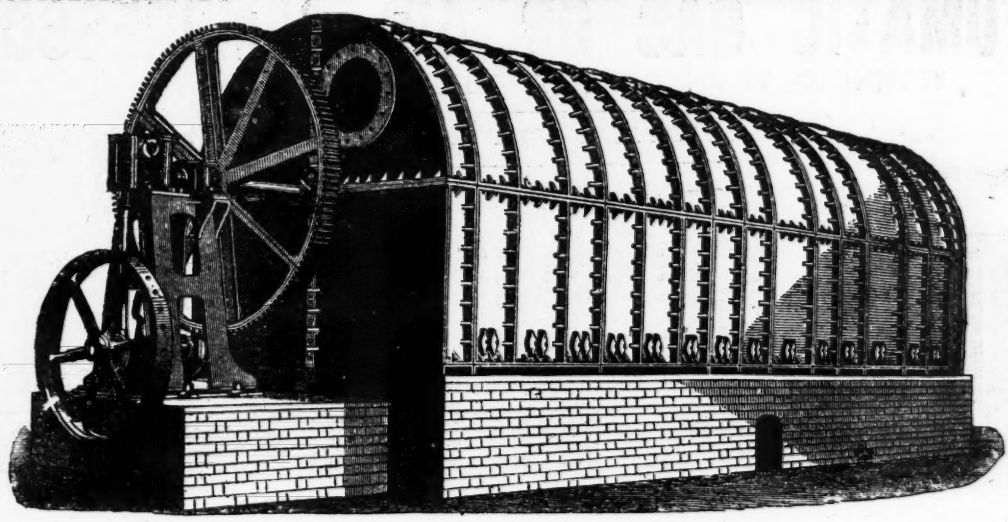
DESIGNS AND ESTIMATES ON APPLICATION.

H. KIRKHAM'S PATENT "IMPERIAL" WASHER-SCRUBBER.



TESTIMONIALS.

The Dover Gaslight Company,
Gas-Works, Buckland,
Dover, Feb. 8, 1899.

H. KIRKHAM, Esq.,

Dear Sir,—Have now made further tests with the Washer fitted with your PATENT WASHING DEVICES, and have much pleasure in reporting that *the results were highly satisfactory*; also, I ascertained that the maximum results were obtained when the machine was working at three revolutions per minute. At this speed 13 to 14 gallons of water per ton of coal carbonized were converted into 10-oz. Ammoniacal Liquor, and at same time the Gas was free from Ammonia.

Should you wish further details, I will forward them.

I am, dear Sir, yours truly,
RAPHAEL HERRING, Engineer.

The Dover Gaslight Company,
Gas-Works, Buckland,
Dover, April 4, 1900.

Re H. KIRKHAM'S PATENT WASHER.

Please note I have much pleasure in stating that one of the above Patent Washers, 1,000,000 cubic feet capacity per 24 hours, has now been in regular action day and night for about 18 months, and is still working to our entire satisfaction.

Six months ago I examined the interior, and then found the Scrolls clean and bright, due, in my opinion, to the flushing action of the fluid rushing from inside the Scrolls.

Also when passing its maximum quantity of gas it gives the minimum of pressure.

For further Particulars see my report to Mr. H. Kirkham, Feb. 8, 1899.

Yours truly,
RAPHAEL HERRING, Engineer.

The Dover Gaslight Company,
Gas-Works, Buckland,
Dover, Dec. 29, 1900.

H. KIRKHAM, Esq.,

DEAR SIR,—Your Washer fitted with Patent Scroll Devices was put to work Nov. 9, 1898, and has been in regular use to this date.

I am sure you will be pleased to know that the excellent results we got when this was first started are still regularly obtained.

Yours truly,
RAPHAEL HERRING.

EFFICIENCY GUARANTEED.

Estimates given for a complete set of Segments for One Wheel, or for refitting the whole number of Wheels in a Machine; also for Washer-Scrubbers complete.

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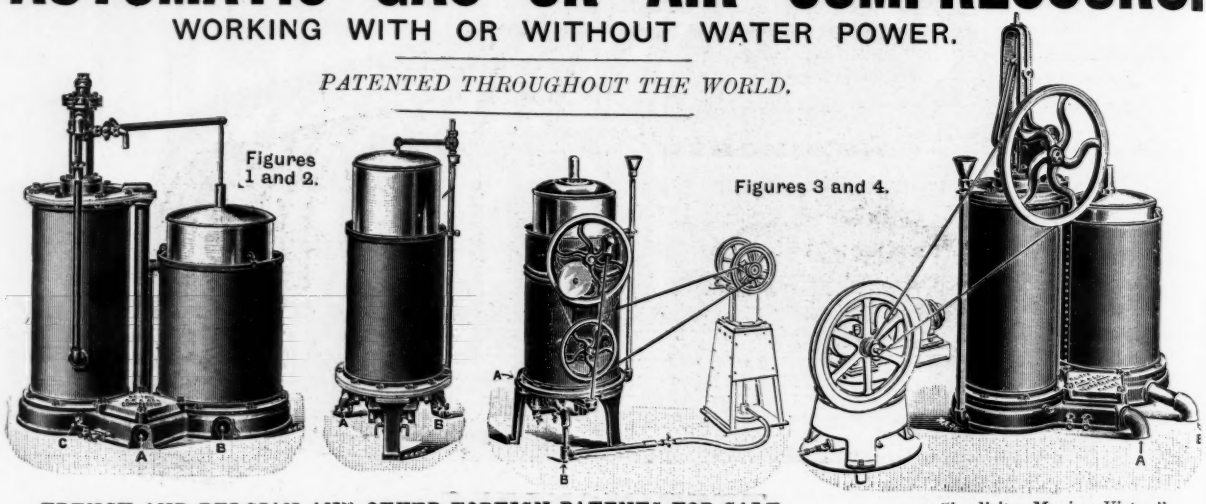
KEITH'S PATENT

AUTOMATIC GAS OR AIR COMPRESSORS.

WORKING WITH OR WITHOUT WATER POWER.

PATENTED THROUGHOUT THE WORLD.



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This INVENTION, as illustrated: Is, as shown by Figs. 1 and 2, worked by the ordinary service; uses an infinitesimal amount of water; requires no attention nor Lubrication; and, as shown by Figs. 3 and 4, may also be worked without water power and solely by the use of gas or oil, giving equally efficient results. In both cases, the Apparatus is absolutely automatic in action; is silent in operation; is devoid of friction in the compressing portion; gives a steady unvarying pressure of gas or air without pulsation on either the inlet or the outlet side; and is the most perfect of its kind in existence. **BEWARE OF UNSCRUPULOUS IMITATIONS.**

Plants of any magnitude designed for automatically increasing Gas Pressure in Low-Lying Districts.

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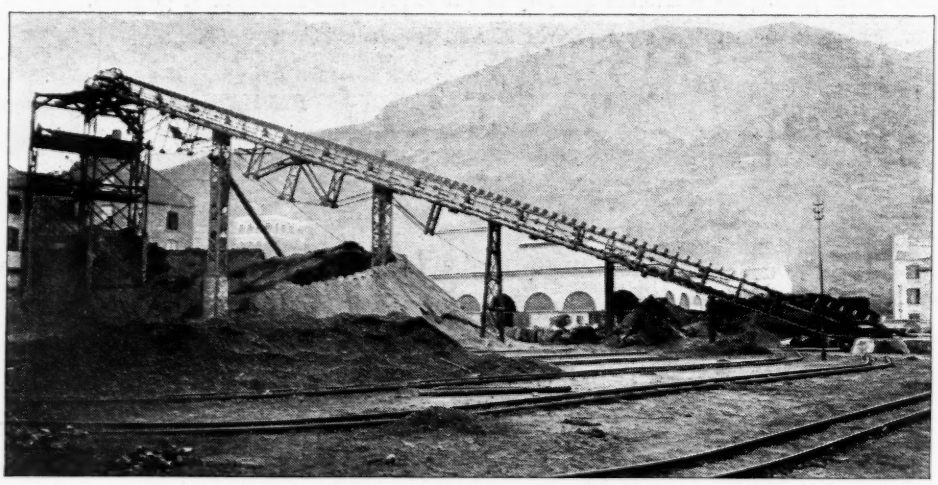

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Head Office
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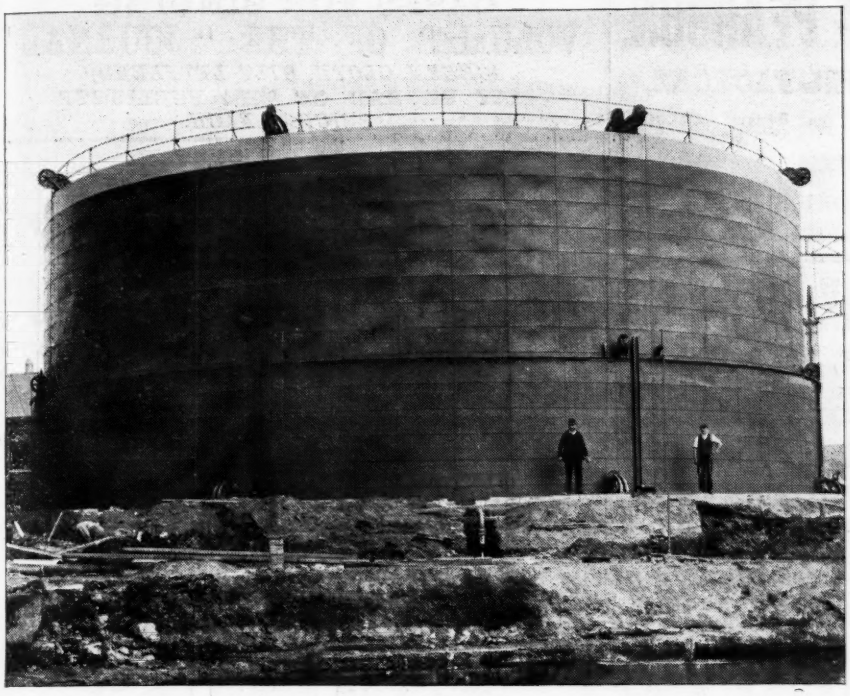

Two-Lift Cable-Guided Gasholder, 80 ft. diameter by 20 ft. deep.
STAFFORD CORPORATION GAS-WORKS. (*From a Photo.*)

COPY OF TESTIMONIAL.

CORPORATION OF STAFFORD,
GAS & ELECTRICITY DEPARTMENT,
STAFFORD, *Feb.* 9, 1899.

Messrs:
ASHMORE, BENSON, PEASE, & CO., LTD.,
Stockton-on-Tees.

GENTLEMEN,

It affords me pleasure to state that our No. 2 Gasholder, from which you removed the outside Guide-Framing on account of it being defective due to the settlement of the foundations, and substituted your Steel-Wire Cable System for both Inner and Outer Lifts, has, since the alteration, **worked perfectly satisfactory.**

Its Stability and Rigidity under High Wind Pressures, when fully inflated, is such that it **preserves the level working of both Lifts, and gives a steady outlet pressure.**

I am, sincerely yours,
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Engineer.

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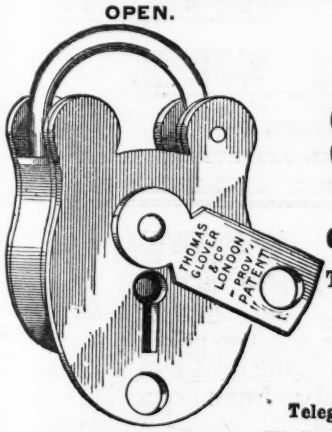

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PREVENTS TAMPERING WITH THE

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The Padlock is Sealed by means of a Lead Eyelet, which is impressed with Company's private mark. Eyelets easily fixed and removed by Company's Collector.

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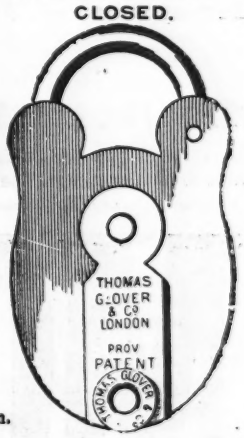

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[See Illustrated Advertisement, Feb. 5, p. 362.]

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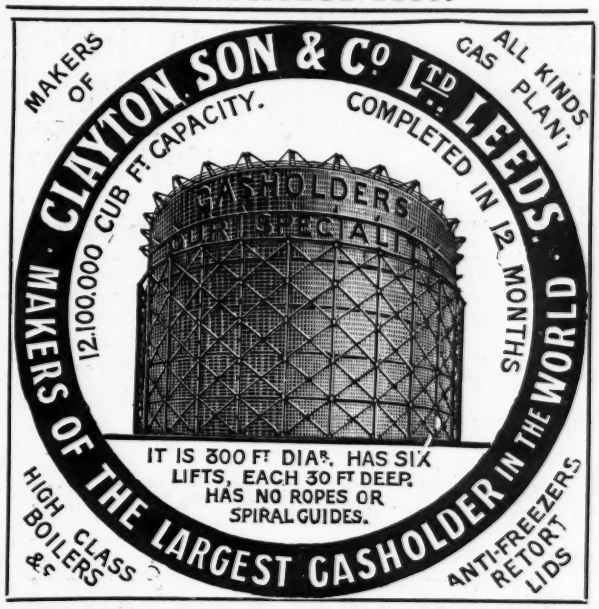
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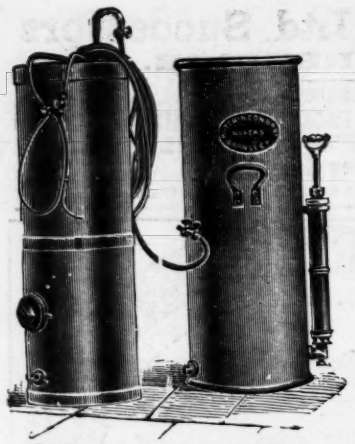

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